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Volume 53, Numbers 1 and 2
JANUARY-APRIL 1957

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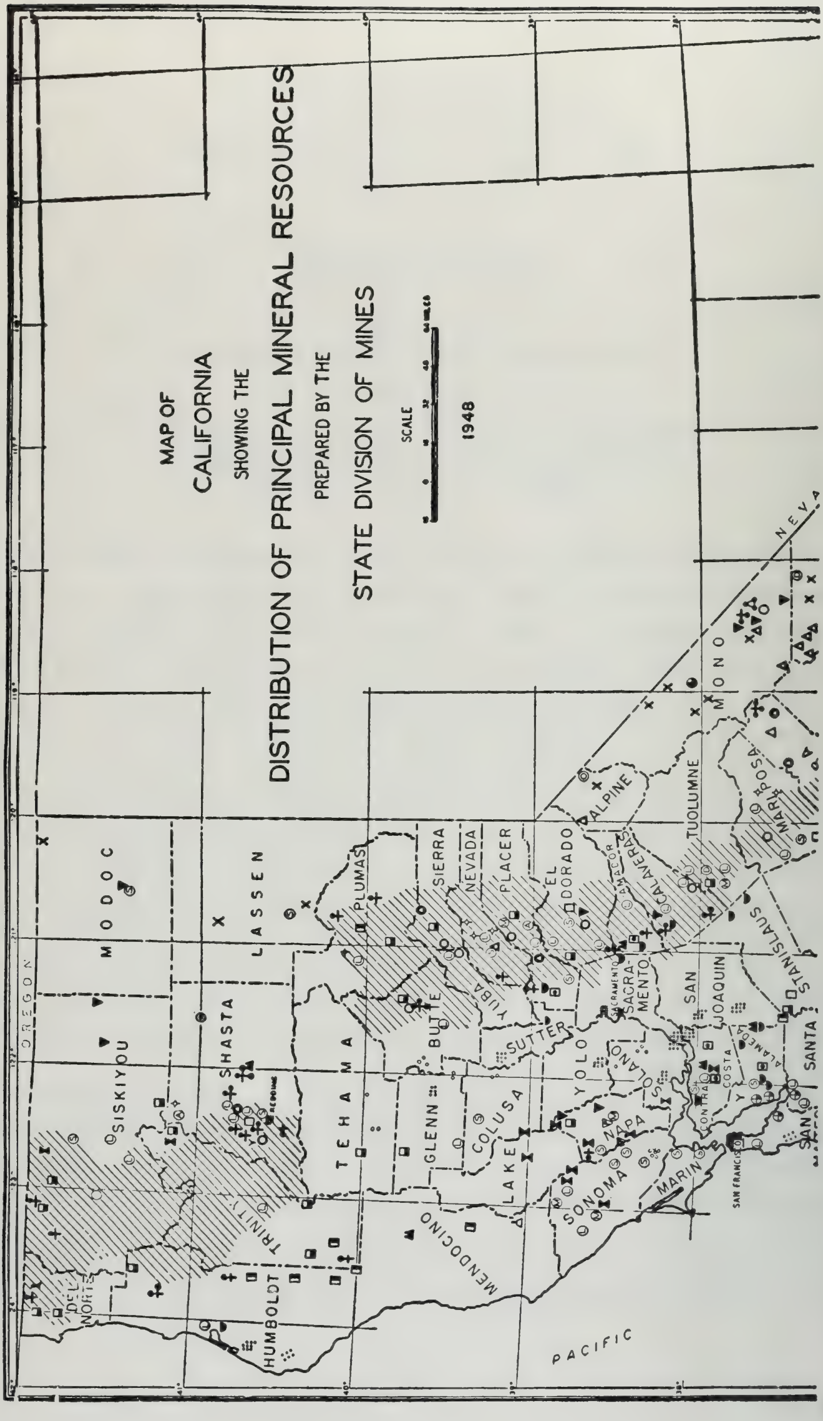
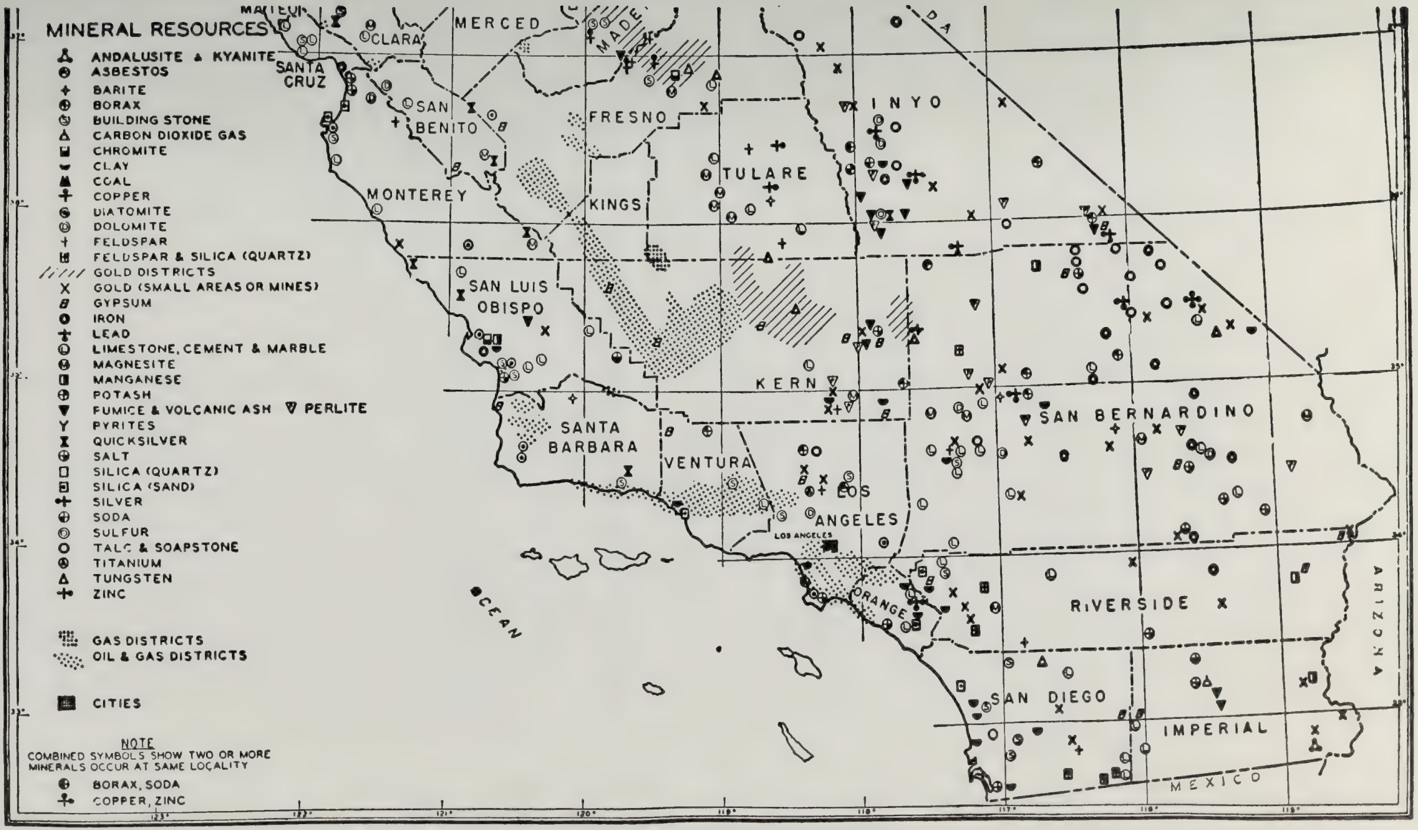

MAP OF
CALIFORNIA
SHOWING THE
DISTRIBUTION OF PRINCIPAL MINERAL RESOURCES
PREPARED BY THE
STATE DIVISION OF MINES
SCALE
1948
OREGON
MODOC
SISKIYOU
SHASTA
LASSEN
DEL NORTE
HUMBOLDT
TRINITY
TEHAMA
PLUMAS
BUTTE
SIERRA
NEVADA
PLACER
YUBA
GLENN
COLUSA
SUTTER
EL DORADO
ALPINE
AMADOR
CALAVERAS
SACRAMENTO
YOLO
LAKE
MENDOCINO
SONOMA
NAPA
SOLANO
MARIN
SAN FRANCISCO
CONTRA COSTA
ALAMEDA
SAN JOAQUIN
TUOLUMNE
STANISLAUS
MARIPOSA
MONO
SANTA
SAN
PACIFIC
NEVA


MINERAL RESOURCES
ANDALUSITE & KYANITE
ASBESTOS
BARITE
BORAX
BUILDING STONE
CARBON DIOXIDE GAS
CHROMITE
CLAY
COAL
COPPER
DIATOMITE
DOLOMITE
FELDSPAR
FELDSPAR & SILICA (QUARTZ)
GOLD DISTRICTS
GOLD (SMALL AREAS OR MINES)
GYPSUM
IRON
LEAD
LIMESTONE, CEMENT & MARBLE
MAGNESITE
MANGANESE
POTASH
PUMICE & VOLCANIC ASH
PERLITE
PYRITES
QUICKSILVER
SALT
SILICA (QUARTZ)
SILICA (SAND)
SILVER
SODA
SULFUR
TALC & SOAPSTONE
TITANIUM
TUNGSTEN
ZINC
GAS DISTRICTS
OIL & GAS DISTRICTS
CITIES
NOTE
COMBINED SYMBOLS SHOW TWO OR MORE MINERALS OCCUR AT SAME LOCALITY
BORAX, SODA
COPPER, ZINC
MATEO
CLARA
SANTA CRUZ
MERCED
MADERA
SAN BENITO
FRESNO
MONTEREY
KINGS
TULARE
INYO
SAN LUIS OBISPO
KERN
SANTA BARBARA
VENTURA
LOS ANGELES
LOS ANGELES
SAN BERNARDINO
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL
ARIZONA
MEXICO
OCEAN
DA
123°
122°
121°
120°
119°
118°
117°
116°
115°
34°
33°

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GEOLOGY OF THE ISLAND MOUNTAIN COPPER MINE, TRINITY COUNTY, CALIFORNIA

By Melvin C. Stinson *

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* Mining Geologist, California State Division of Mines. Manuscript submitted for publication December, 1955.

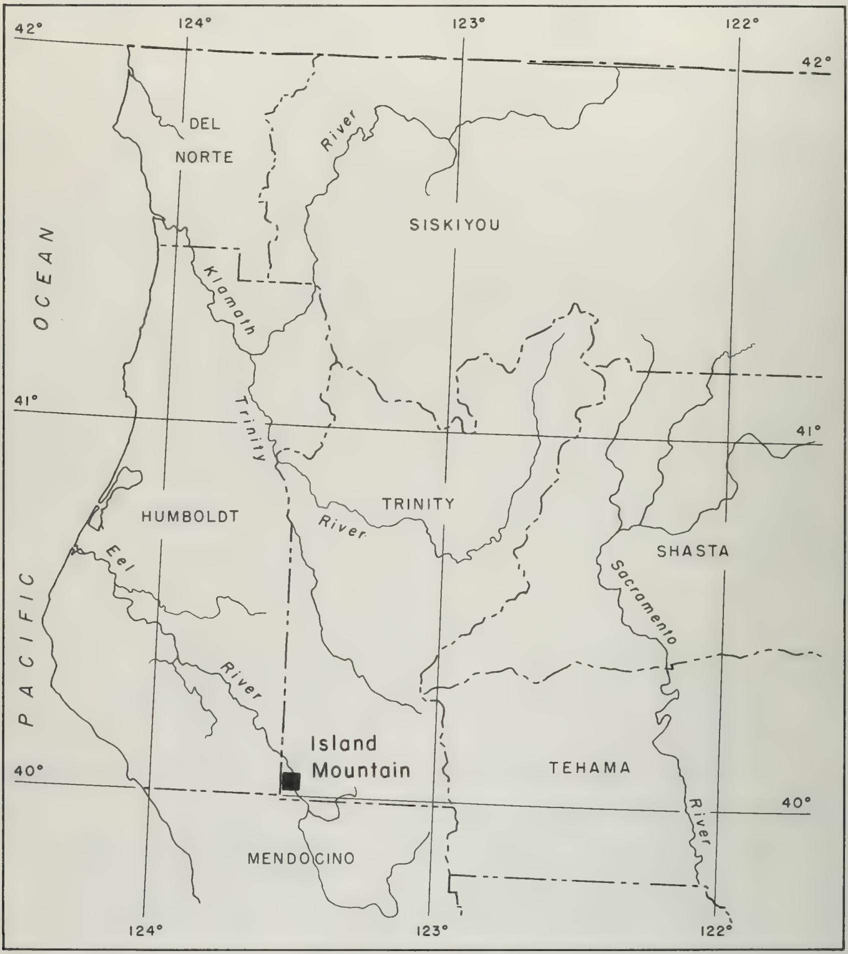
42°
124°
123°
122°
42°
DEL NORTE
River
SISKIYOU
Klamath
OCEAN
41°
Trinity
41°
TRINITY
River
HUMBOLDT
SHASTA
Eel
Sacramento
PACIFIC
River
Island Mountain
40°
TEHAMA
40°
River
MENDOCINO
124°
123°
122°

FIGURE 1. Map showing location of Island Mountain mine area.

ABSTRACT

The Island Mountain copper mine is in the southwestern corner of Trinity County, in the Horseshoe district about 90 miles north of Ukiah and 30 miles east of Garberville.

The deposit is a massive sulfide body consisting largely of pyrite, chalcopyrite, and pyrrhotite, with minor amounts of arsenopyrite, galena and sphalerite, and recoverable amounts of gold and silver. During the period of production from 1915 to 1930, 9,000,000 pounds of copper, 144,000 ounces of silver, and 8,600 ounces of gold were recovered.

The rocks in the mine area are largely graywacke with isolated bodies of shale, chert, and glaucophane schist, all belonging to the Franciscan group of Upper Jurassic (?) age. The sedimentary rocks strike N. 30° W. with steep northeasterly dips.

The sulfide deposit at Island Mountain is of the pyritic replacement type, belonging to the mesothermal zone of deposition. Metallic minerals present are magnetite, pyrite, pyrrhotite, chalcopyrite, arsenopyrite, sphalerite, bornite, and galena; an assemblage characteristic of high temperature conditions of formation. Gold and silver present in small quantities are probably carried by the pyrite and chalcopyrite in solid solution or as mechanical admixtures. Secondary enrichment with the formation of secondary copper and iron minerals has occurred to a limited extent along the upper contact of the ore body.

The ore body occurs as a lenticular mass of sulfide minerals along a shear zone in a slightly metamorphosed shale. Intensely sheared zones in the shale have been the most favorable structural control in ore deposition. The rock is sheared apparently in several directions but the average is northwest and roughly parallel to the strike of the bedding of the sedimentary rocks in the immediate mine area.

Post-mineral parallel or nearly parallel faults having a strike parallel to the strike of the bedding in the sedimentary rocks and a nearly vertical dip, are present at Island Mountain.

INTRODUCTION

Recent national demands for increased production of copper, iron and sulfur have prompted extensive searches for sources of these strategic minerals. In addition to the search for new deposits, an investigation of deposits of low-grade ore which have been mined in the past is being carried on.

The massive sulfide deposit at Island Mountain, Trinity County, California, is owned by E. R. Leach of Oakland, California, and associates, and is one of the largest sulfide ore bodies known in rocks of the Franciscan group. Originally the known ore body consisted of approximately 280,000 tons of sulfide ore containing recoverable amounts of copper, silver, and gold. From 1915 to 1930, 132,000 tons of ore were mined producing 9,000,000 pounds of copper, 144,000 ounces of silver, and 8,600 ounces of gold. The remaining estimated 158,000 tons of ore in the deposit has not been worked since the mine closed in 1930.

The mine property is located in sections 9, 10, and 15, T. 5 S., R. 6 E., Humboldt Meridian, and consists of 266 acres of land as follows: four mining claims of 57 acres held under government minerals patent; 106 acres held under agriculture patents; and 103 acres for which the state has issued its certificate of purchase.

The field examination of the Island Mountain area that furnished the basis for this report was made by the writer assisted by J. Grant Goodwin during the last two weeks in October, 1952. During this time the immediate mine area was mapped in detail with a plane table and data for a geologic map was obtained. Further field work was done by the writer in July 1953.

The only U. S. Geological Survey topographic maps available which include the area studied are the Hoaglin quadrangle map with a scale of 1 : 125,000 and a 100-foot contour interval, and the Kettenpom quadrangle preliminary blueline map with a scale of 1 : 48,000 and a 50-foot contour interval. A series of U. S. Forest Service aerial photographs is available and was used as a base map for a general geologic reconnaissance of the area.

The author wishes to express his appreciation to Mr. E. R. Leach for making available old reports, photographs, production records, and underground maps of the Island Mountain mine and to Mr. George Norris who worked in the mine and was able to supply the writer with much first hand information. The writer is also indebted to Gordon D. Bath of the Geological Survey for providing the results of a preliminary magnetometer survey of the mine area.

Little information has previously been published regarding the geology of this region. The only information available is found in reports by Aubury (1902, pp. 124-126, 1908, pp. 148-150), Brown (1913-1914, p. 881), and Miller (1890, p. 716) on the Island Mountain Consolidated copper mine. Several private mine reports[1] are believed to exist but the writer was able to refer to only one of these[2] and a preliminary report by E. R. Leach in 1911 or 1912.[3]

Geography. Island Mountain is a Northwestern Pacific railroad station which lies at an elevation of 550 feet on the west bank of the Eel River in the southwestern corner of Trinity County. It is in Township 5 South, Range 6 East, Humboldt Meridian, about 90 miles north of Ukiah and 30 miles east of Garberville. U.S. Highway 101 passes within 30 miles of Island Mountain; the remaining 30 miles is traversed by an improved dirt road and 5 miles of unimproved dirt road. During extremely wet winters the last 5 miles of the road is ordinarily impassable for several months. The Northwestern Pacific railroad line between San Rafael and Eureka passes within 400 yards of the mine. When the mine was in operation, an ore bin was located on a railroad siding a few hundred yards north of the present Island Mountain station.

The mine area lies in the Northern Coast Ranges geomorphic province (Jenkins, 1943, pp. 82-89), a region characterized by northwest-trending ridges and valleys. The area is fairly rugged, having steep hills, narrow deep canyons, and numerous jagged pinnacles of greenstone. Most of the ridges are two to three thousand feet in elevation; the ridge to the east of the settlement is nearly four thousand feet. Landslides are very common, especially in the mine area, where a huge slide occurred in 1937. Numerous permanent springs provide an adequate water supply.

Winter rainfall is generally heavy and floods are not uncommon. Occasionally snow falls but usually only in small amounts.

REGIONAL GEOLOGY

All of the rocks in the vicinity of Island Mountain, with the exception of a small body of hornblende andesite and the landslide material and alluvium, are tentatively assigned to the Franciscan group of Upper Jurrasic (?) age. The map units shown on the accompanying map are: graywacke; black shale; red, green, and gray chert; greenstone; diabase; andesite; glaucophane schist; Tertiary hornblende andesite; landslide material; and alluvium.

Rock Units

Franciscan Group

Graywacke. The most widespread rock type at Island Mountain is well bedded graywacke. The typical graywacke is medium-grained and is composed mostly of sub-angular grains of quartz with subordinate plagioclase in the oligoclase-andesine range, and sufficient black shale fragments to give the rock a grayish green color. The percentage of shale fragments in the rock varies from less than 5 percent to over 25 percent.

---

[1] According to Mr. E. R. Leach there have been two unpublished reports on the Island Mountain mine. The first report was written by W. B. Devereau prior to 1905; the second was written by A. C. Lawson in 1918.

[2] Lawson, A. C., The Island Mountain copper mine. Unpublished mine report, pp. 1-8. 1918.

[3] Leach, E. R., The Island Mountain copper mine. Unpublished mine report, pp. 1-6, 1911 or 1912.

A zone of graywacke exposed along Pine Creek below the bridge consists of alternate layers of fine-grained graywacke and graywacke containing rounded, roughly aligned pebbles of black shale. The largest pebbles are a centimeter or more in diameter. The pebbles average about 0.5 cm. in diameter.

Many of the prominent ridges are composed of graywacke, as it is very compact and resistant to weathering. Most of the landslides have occurred at or near the contact between graywacke and lenticular bodies of black shale incorporated in shear zones.

Black Shale. The black shale bodies that are enclosed by the graywacke are narrow and lenticular, having an average width of about 100 feet. Most of the shale is thoroughly fractured and in some localities has been slightly metamorphosed to a pencil shale. Locally it is almost a slate. The shale is composed largely of quartz and feldspar and enough carbonaceous material to give it a black color.

In the landslide area near the mine, particularly at the upper end of the landslide, the shale has been silicified and re-cemented to form massive boulders.

Chert. Also within the graywacke are lenses of chert which are aligned approximately parallel to the general strike of the graywacke (N30°W). Most of the chert is red or brown in color; locally the chert is gray or green in color.

Massive red and brown chert comprises the western half of a large bluff overlooking the ore deposit. It is in contact with glaucophane schist on the east side and in fault contact with graywacke on the west side. The upper and lower contacts are concealed by landslide material. The chert is thoroughly fractured and partly recrystallized. Veinlets of calcite, which are abundant in the chert, fill the interstices and cement the fractured rock. The red and brown color is caused by a hematite-limonite stain. Radiolaria replaced by silica are found only in the red and brown chert.

A lens of bedded gray and green chert forms a small ridge trending northwest along the eastern edge of the landslide in the immediate mine area. The gray and green chert contains no iron minerals but does contain chlorite and aegerine. The bedding in the chert strikes to the northeast and dips to the northwest.

A lens of thoroughly fractured and folded, thin-bedded, gray-green, banded chert is near the west end of the railroad quarry about 200 yards south of Island Mountain settlement. The chert is separated from the graywacke by a 5-foot zone of fractured black slaty schist and gouge. This zone appears to be the southeast extension of the fault that passes through the mine area.

Greenstone. Many sharp, jagged pinnacles of greenstone rise above the tops of the ridges in the area. A large mass of greenstone, just south of the settlement of Island Mountain is being quarried by the

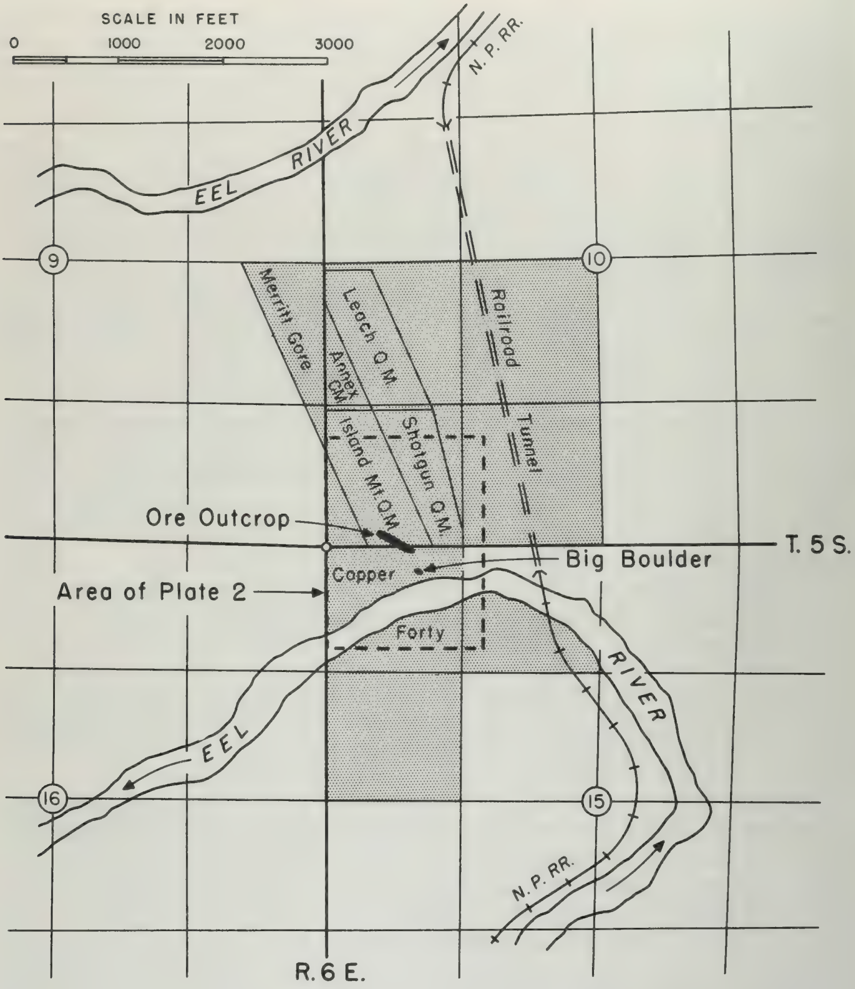
SCALE IN FEET
0
1000
2000
3000
EEL RIVER
N. P. RR.
9
10
16
15
Merritt Gore
Leach Q.M.
Annex Q.M.
Island Mt. Q.M.
Shotgun Q.M.
Railroad
Tunnel
Ore Outcrop
Big Boulder
T. 5 S.
Copper
Forty
Area of Plate 2
EEL
RIVER
N. P. RR.
R. 6 E.

FIGURE 2. Property map of the Island Mountain Copper mine. Trinity County, California.

Northwestern Pacific for use as road metal. The greenstone at this locality is a very compact, unweathered rock composed of feldspar and chlorite, containing many veins and veinlets of calcite and quartz, and in some places a considerable amount of pyrite.

The other greenstone bodies are composed of rock very similar in appearance to that exposed in the railroad quarry. A small mass of greenstone and gray chert is found along the railroad track near the southeastern edge of the mapped area. This body of rock does not appear to be in place—possibly it slid down from the large pinnacle to the east.

Diabase. A small body of diabase is exposed about a third of a mile southeast of the north end of the railroad tunnel. The diabase forms a low, flat bluff about 30 feet high, which can be seen from Copper Creek. The discordance between the steeply dipping graywacke and the nearly horizontal diabase suggests that the diabase body is a dike.

The diabase is a fairly compact rock containing lath-shaped crystals of andesine in a groundmass of an altered pyroxene, probably augite, and some scattered pyrite and magnetite. Numerous veins of white secondary quartz occur in the diabase near the bottom of the bluff. A gold prospect was reported [4] to have been located here and to have yielded several tons of gold-bearing quartz, but the writer noted no evidence of mineralization in the quartz veins.

Andesite. Three small but prominent outcrops of andesite on the slope above the mine and a larger mass of andesite exposed several hundred yards farther west probably indicate a body intrusive into the graywacke.

The andesite is composed of altered plagioclase, unidentified ferromagnesian minerals, and a small proportion of magnetite and pyrite. The rock has been badly altered to chlorite, epidote, and veins of calcite. This rock, for reasons to be discussed in a following section, is believed to be older than the porphyritic hornblende andesite that occurs on the slope above the railroad tunnel. A late Mesozoic age, possibly late Jurassic, has been given to the altered andesite.

Glaucophane Schist. Several isolated masses of glaucophane schist form prominent outcrops in the Island Mountain area. A large body of glaucophane schist forms a bluff overlooking the mine. The schist is in sharp contact on the west with brown, iron-stained chert that makes up the western two-thirds of the bluff. The eastern contact of the schist and the black shale is gradational. The glaucophane schist is progressively richer in chlorite, muscovite, and actinolite toward its contact with the shale. Secondary quartz both as veins and as crystals lining small cavities is in the zone nearest the shale. Accessory minerals in the schist include muscovite, chlorite, actinolite, epidote, calcite, quartz, pyrite, and lawsonite (?). Whether or not the glaucophane schist is in place could not be determined from available evidence.

A large body composed of chlorite schist grading into glaucophane schist is exposed on the north slope of the mountain on which the mine is located. This body contains zones of pyrite, largely in the chlorite schist and red garnet crystals, chiefly in the glaucophane schist. Other masses of glaucophane schist, such as the one that forms the large knob west of the Island Mountain settlement, contain various proportions of chlorite. Calcite, epidote, actinolite, and pyrite also are locally present in the schist.

Porphyritic Hornblende Andesite

A small flat-lying body of porphyritic andesite crops out near the top of the mountain through which the railroad passes. The andesite is composed of plagioclase in the andesine-oligoclase range, dark green to brown euhedral crystals of hornblende, and a small amount of biotite, pyrite, and magnetite. The andesite at this locality differs greatly in appearance from the andesite found at other localities. The most notable difference, in addition to its lack of alteration, is its different structural relationship. The andesite found at the other localities, in addition to being badly altered and non-porphyritic, is probably intrusive into the graywacke. The porphyritic hornblende andesite probably originated as a surface or near surface flow. For these reasons, a Tertiary age has been assigned to this andesite.

---

[4] George Norris, personal communication, 1952.

Landslide Material

Although many landslides are to be seen in this region, most of them are restricted to zones of black shale in the graywacke. These areas are almost all marked by water seeps which flow throughout the year.

Landslide debris consisting of soil, talus, and some mine dump material covers the ore deposit and most of the bedrock in the area immediately about the mine. The landslide forms a layer ranging in thickness from a few feet to a maximum of at least 25 feet at the lower end of the slide. The area surrounding the ore deposit appears to have been the scene of many landslides covering a long period of time. The magnitude of the 1937 landslide was probably increased by the removal of underground material during mining activities. The area is still unstable as indicated by a large crack in the lower end of the gray and green chert outcrop, and the many cracks and joints in the bedrock and the soil.

Two other landslides near the railroad tracks occurred during the winter of 1952-53 and temporarily blocked the tracks.

Alluvium

Alluvium is confined to the banks of the Eel River and consists of sand, gravel, and rock debris deposited by the river during the winter and spring high-water periods. The creeks and streams draining into the Eel River, which have steep gradients and occupy narrow channels, have deposited little or no alluvium along their banks.

STRUCTURE

The major structural feature of the Island Mountain region is a homocline within beds of graywacke and black shale belonging to the Franciscan group. The strike of the bedding of the graywacke and shale is north-northwest and the average dip is 70° northeast. Paralleling the general strike of the graywacke and shale are several notable faults marked by depressions and in several localities by shear zones and landslides.

A shear zone that may coincide with a significant fault is within the graywacke just east of the area included on the geologic map of the mine area. This fault is marked by a general depression traceable northward over the mountain for several thousand yards, by two small landslides, and by two springs which flow during most of the year. Southward the fault can be traced as far as the west side of the area mapped. Another fault within the graywacke is on the north slope of the mountain near the northern end of the railroad tunnel. This fault has a strike of N. 30° E. and a dip of 70° to the northwest. Displacement on these faults could not be determined.

The only structure visible in the shale beds is west of the north end of the railroad tunnel, where the shale beds are offset as much as 3 feet by several small faults. Several drag folds are also visible in the shale at this location.

Associated with the graywacke and shale are isolated lenses of chert and glaucophane schist that are probably the remnants of continuous belts broken up by faulting. The strike of the bedding of the red and brown radiolarian chert and glaucophane schist mass cropping out above the Island Mountain mine is parallel to the enclosing graywacke; however, the dip of the bedding is vertical. The strike of the bedding of the large body of gray-green chert on the east side of the mine is N. 10° E. and the dip is 65° W. This chert appears to have overturned and rotated slightly and to have moved downslope some distance.

Intruded into the graywacke are several bodies of greenstone which probably originated as plugs and dikes. Others appear to be remnants of an extensive, thick sill, also intrusive into the Franciscan, which by erosion has been dissected into the several isolated masses now observable on the summits of the region, with Franciscan rocks below them on all sides. The flat-lying isolated masses of diabase and andesite are also remnants of a sill or dike.

ISLAND MOUNTAIN MINE

History and Production

Mineralization was first noted in the Island Mountain mine area sometime before 1897, when a spring with a high copper content was found and named Poison Spring. Many medicinal properties were attributed to the water; it was first used as a cure for sores on horses and later was tried as a cancer cure.

About 1897, Sam H. Rice, who was making a survey of the boundary between Trinity, Mendocino, and Humboldt counties, recognized copper ore in the mine area. It was then that F. A. Leach, one of the founders of the Island Mountain Copper Company, became interested in the area. However, no mining was done at this time.

In 1889, the London Exploration Company was given an option on the property. Company field engineers believed that the sulfide ore was part of a wide vein that extended downward. A tunnel was driven northward 490 feet from a point 50 feet north of the river bank, but ore was not encountered. It was concluded that the ore body was not part of a vein, and the project was abandoned.

A few years later, the U. S. Smelting and Refining Company sent A. P. Anderson to examine the property. On the basis of his report, the company took an option on the property, but did not do any mining.

In 1905 W. B. Devereau, Charles N. Felton, and associates, took an option on the property and explored the deposit extensively. Several shafts and tunnels were completed and numerous samples were taken. However, no ore was mined and in the winter of 1905 the property was abandoned.

The U. S. Smelting and Refining Company under A. P. Anderson again became interested in the deposit, took another option, and did a little work before they, in turn, abandoned the project.

Table 1. Production data, Island Mountain Copper Company, 1915-1930 (After E. R. Leach).

Year	Production (dry tons)	Copper		Gold		Silver	
		Pounds	Average percent copper	Ounces	Average per ton ounces	Ounces	Average per ton ounces
1915	2,350	300,000	6.38	300	0.1276	2,000	0.851
1916	10,077	1,573,167	7.80	853	0.0847	9,328	0.925
1917	8,615	1,304,901	7.57	866	0.100	9,788	1.136
1918	5,255	744,620	7.36	600	0.1141	5,042	0.95
1919	259	27,600	5.32	34	0.1312	202	0.779
No production 1920 and 1921							
1922	1,191	42,122	1.76	56	0.0470	1,489	1.25
1923	4,600	276,300	3.00	370	0.0804	5,096	1.107
1924	10,978	549,598	2.50	612	0.055	13,958	1.27
1925	8,798	439,766	2.50	621	0.0706	8,393	0.998
1926	17,008	760,410	2.23	996	0.0585	18,761	1.103
1927	16,795	733,756	2.18	1,004	0.0598	18,923	1.125
1928	16,622	673,614	2.03	746	0.0448	18,783	1.129
1929	16,316	615,842	1.89	817	0.0500	16,722	1.02
1930	12,734	604,518	2.38	702	0.0551	15,251	1.197
Totals	131,598	8,676,214	3.296	8,577	0.0651	143,736	1.092

The Northwestern Pacific railroad was completed in the fall of 1914 and, in April 1915, began regular scheduled operations. With a railroad nearby, the Island Mountain Consolidated Copper Company soon began mining the deposit. The first three years of operation were carried on in the shafts and tunnels driven by Devereau and his associates. Mining operations were continuous from 1915 through 1930 with the exception of the period from early in 1919 to the fall of 1922 when a drop in copper prices caused the mine to close.

During the first months of mining the ore was pushed in cars across a suspension bridge purchased from the Utah Construction Company which had just completed the railroad tunnel. The ore was dumped into an ore bin at the end of the bridge, loaded into a dump truck, and hauled to a hopper on a railroad siding. However, during later operations, ore was conveyed on an aerial tramway from an ore bin at the mine to a large storage bin on a railroad siding near the south end of the Eel River railroad bridge. The ore was then sent to Tacoma, Washington for smelting.

Operations at Island Mountain ceased in the winter of 1930 when the price of copper dropped. Although the mine was completely equipped and ready to begin operations should the price of copper increase, it was never put into operation again.

The huge landslide of 1937 completely buried the tunnels and shafts with rock debris and mine dump material. The buildings and equipment have either fallen into ruin or been carried off since the mine closed.

In the 12 year period of activity, about 132,000 tons of ore were shipped to the smelter. This ore averaged 3.296 percent copper, 1.092 ounces of silver, and 0.0651 ounce of gold per ton.

The accompanying table is a summary of the production record of the mine from 1915 to 1930. The high copper content of the ore mined during the first five year's operations was obtained by mixing high grade ore from boulders of float, found on the edge of the river, with the regular ore.

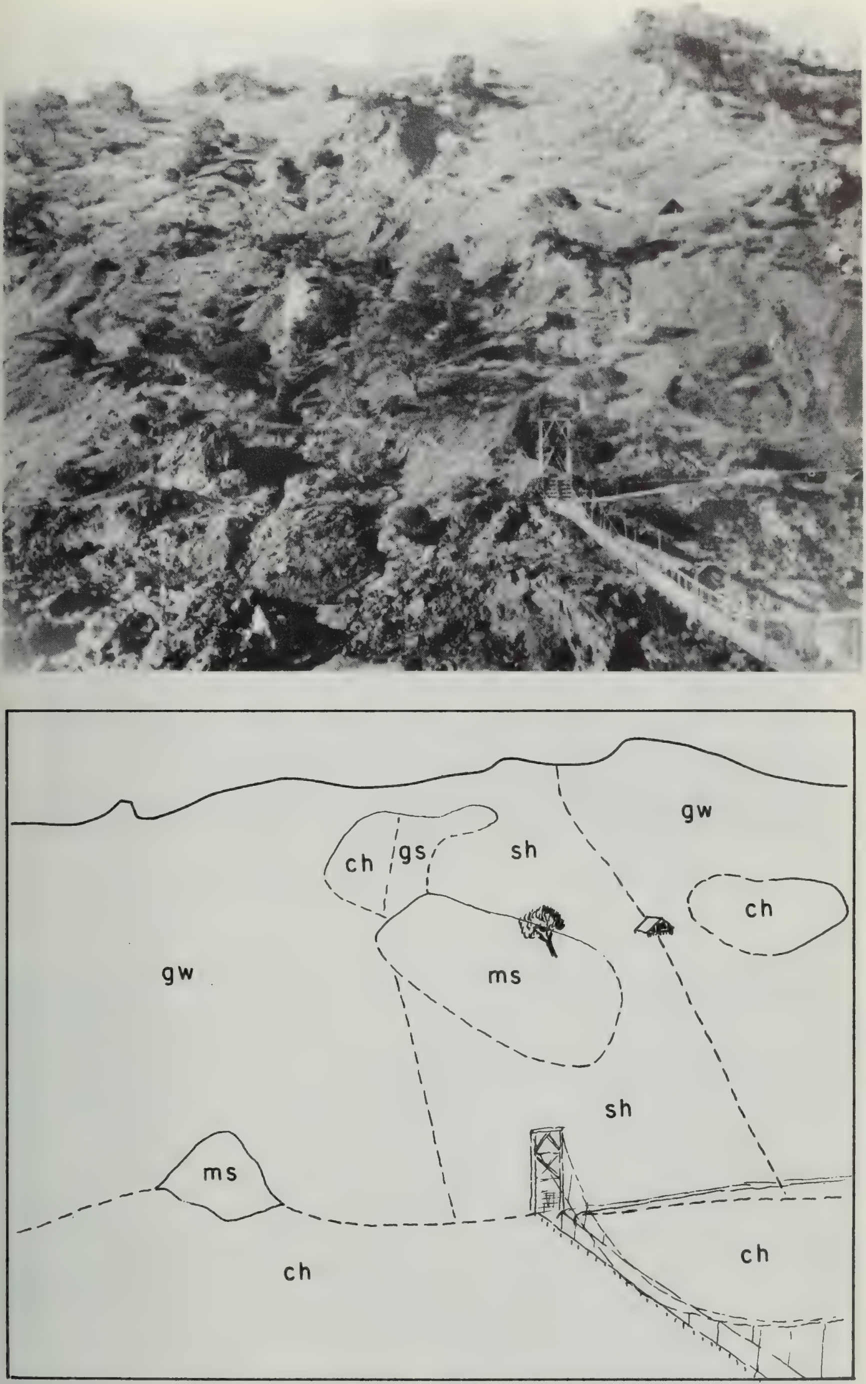

FIGURE 3. *A*. Island Mountain mine area in 1915, before mining operations began. *B*. Sketch of *A* showing outcrops of rocks in the mine area. Gw = graywacke; Ch = chert; Sh = shale; --- = approximate contact. *Photo by E. R. Leach.*

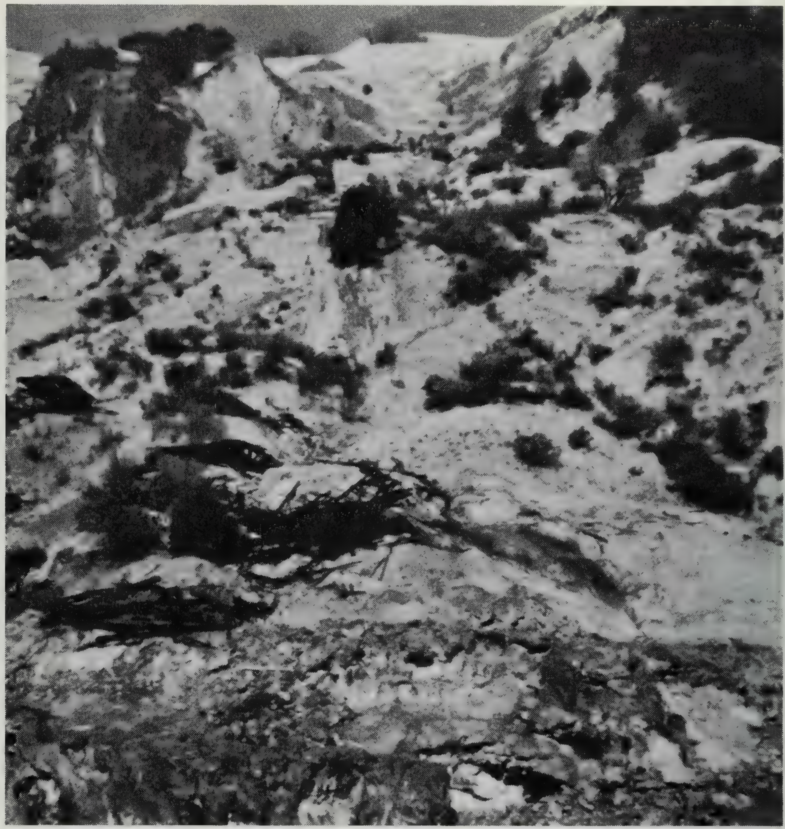

FIGURE 4. Island Mountain mine area in 1952. Landslide area in upper center, mine buildings near left, and chert boulders in foreground of picture.

Geologic Units in the Mine Area

Graywacke, black shale, chert, and glaucophane schist, all belonging to the Franciscan group, are the rock units found in the immediate vicinity of the Island Mountain mine, together with unconsolidated alluvium and landslide material. These rock units are shown on the map, the cross sections, and the geologic plan of the underground workings.

Ore Deposit

General Character and Distribution. The known ore deposit at Island Mountain is a large body of massive sulfide containing pyrite, chalcopyrite, pyrrhotite, and minor proportions of arsenopyrite, galena, sphalerite, cubanite, bornite, and magnetite. Gold and silver occur in recoverable amounts, probably in solid solution or as a mechanical admixture in the chalcopyrite or pyrite.

The ore body blocked out before mining operations began in 1915 was kidney-shaped, trended in a northwesterly direction, and plunged into the mountain at a low angle. The accompanying figure shows the approximate outline of the ore body. The lowest part of the ore body was about 120 feet above the river. The ore body was 450 feet long at the surface, 120 feet wide at the widest part, 140 feet thick, and was estimated to contain 275,000 tons of ore (Leach, 1911, p. 2).

Below the main ore body and near the river was a huge boulder of solid ore that was believed to have slid down from its original position about 300 feet higher on the ridge. This boulder was 40 feet high and contained about 5,000 tons of ore averaging 5 percent copper. Below this boulder and nearer the river was another boulder weighing approximately 200 tons and containing about 20 percent copper. Smaller boulders of float ore recovered from the lower part of the mine area brought the total amount of float ore to about 8,000 tons.

The ore shown cropping out near the center of the immediate mine area is believed to be part of the original large kidney-shaped ore body. All that remains of the float ore are many small fragments of the original boulders.

The minerals which constitute the ore body were deposited in the shale and graywacke by a process of metasomatic replacement. The boundaries of the ore visible at the present time grade off rapidly into the country rock. Most of the ore body is remarkably deficient in gangue minerals, such as quartz, and it is only where it has but partially replaced the country rock that it can be said to have a gangue of residual unreplaced shale.

The ore body and the surrounding crust of partially replaced shale appear to be in fault contact with the enclosing black shale and sheared

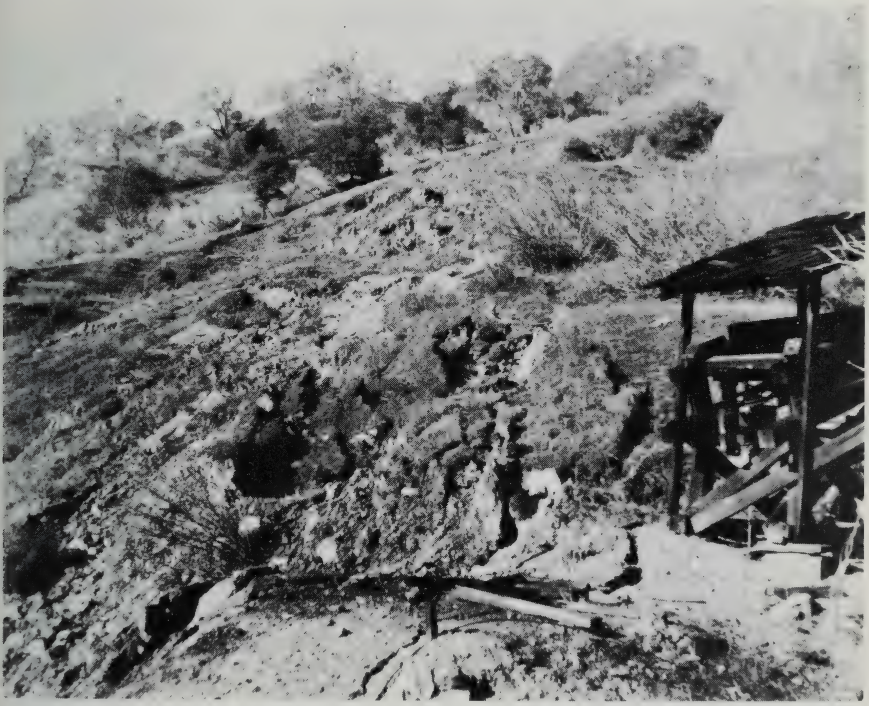

FIGURE 5. View west towards a low tree-covered ridge which marks the western border of the shear zone. Cracks in the soil show in the foreground. *Photo by E. R. Leach, 1916.*

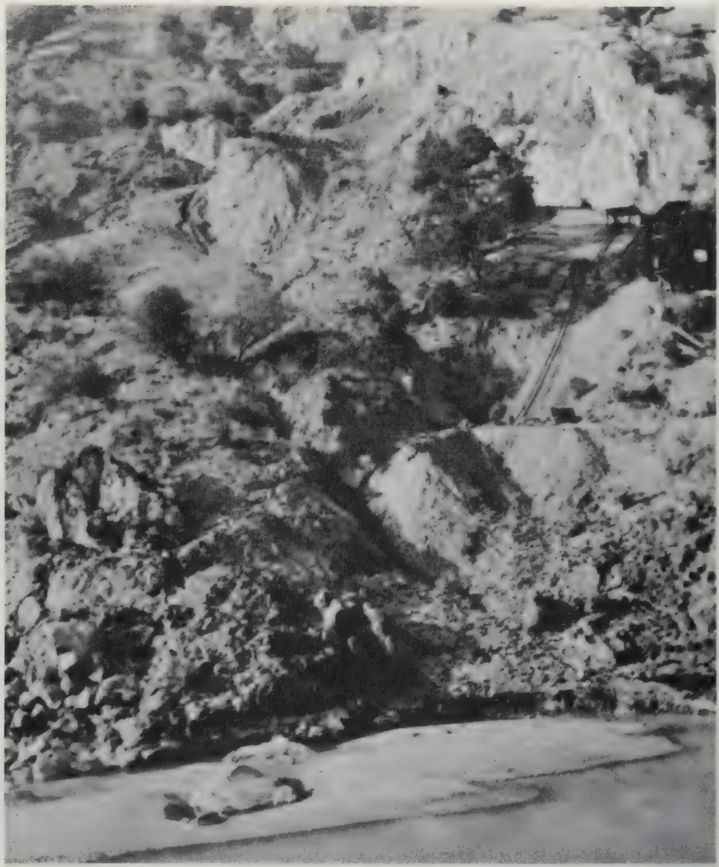

FIGURE 6. Lower end of mine area after mining operations had begun. Ore hoppers and north end of suspension bridge are seen near the right center of the picture. Eel River in the foreground. *Photo by E. R. Leach, 1924.*

graywacke of the Franciscan group. The structural relationship between the ore body and the country rock could not be ascertained because of the obscuring mass of landslide debris and the inaccessibility of the underground workings. The following comments regarding the boundaries of the ore body were made by A. C. Lawson (1918, p. 2-3) when he visited the property and examined the underground workings of the mine:

> "The boundaries of the ore body as they are revealed in the mine workings are: (1) the original footwall of the mass, (2) the original hanging wall, and (3) various faults which have dislocated it.
>
> The footwall is the upper surface of a zone of intense shearing and internal movement. The softer rocks have been crushed and mashed to clay, and the harder layers have been broken and pulverized by attrition, leaving many residual boulders such as are common in fault gouges. The depth of this zone of crushed rock is unknown but the condition is significant of a great fault, probably a thrust, which makes a low angle with the horizon. The general strike of this fault is about north-northwest to northwest and the dip is easterly. The ore does not seem to have been involved in this great fault movement, and it is therefore fair to infer that the fault itself was a dominant condition in determining the deposition of the ore.

The original hanging wall of the ore body presents a notable contrast to the footwall. The rocks above the ore are sandstones and shales as in the footwall, but they have been affected by crushing, internal movement and gouging to a relatively slight extent and in general are in their normal condition. No sharp wall marks the transition from the ore to the hanging wall country, but the passage is gradational through a rock with disseminated sulfides to the ordinary unmineralized country rock. Both the hanging and footwall boundaries of the ore body dip in a general way to the northeast, tho with undulations.

Besides the hanging wall and the footwall, there are several fault boundaries. Where the faults dip under the ore they have been hitherto regarded as portions of the regular footwall and where they dip away from the ores, as portions of the regular hanging wall. From a miner's point of view, there is no objection to regarding these faults as footwall or hanging wall as the case may be; but the acceptance of this view precludes the suggestion that the ore has been dislocated and portions of it displaced above or below the level upon which the supposed original boundaries are encountered. It is, therefore, important for the purpose of getting a line on the possible extension of the ore body beyond its present known limits, to discriminate between the original boundaries of the ore—the foot and hanging walls, and boundaries that may have been secondarily imposed by faulting. Several such bounding faults were recognized in the course of my examination, as well as other faults which traverse the ore body without establishing limits to its perceptive extent."

At the present time, there is no visible evidence of the secondary faults mentioned by Lawson above.

Before mining operations began at Island Mountain, part of the deposit was carefully sampled by assaying samples obtained by quartering all of the ore extracted in the course of driving the exploration tunnels and shafts shown on the preliminary underground map. The assays showed copper ranging from half a percent to 27 percent with 3.14 percent a conservative estimate of the average. The sampled ore

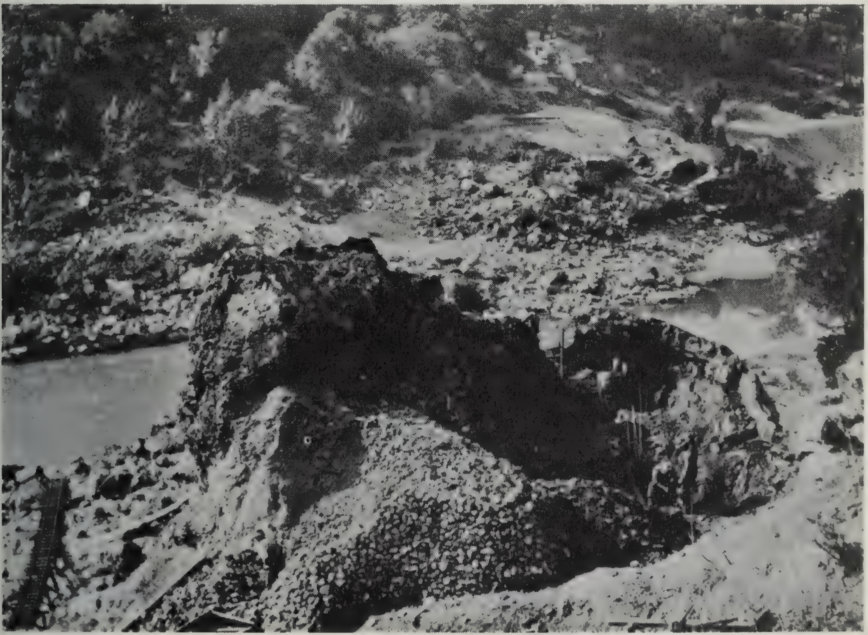

FIGURE 7. Large boulder which contained over 5,000 tons of 5 percent copper ore. This boulder was 40 feet high and was located near the Eel River at the southwestern edge of the mine area. View toward the southwest. *Photo by E. R. Leach, 1916.*

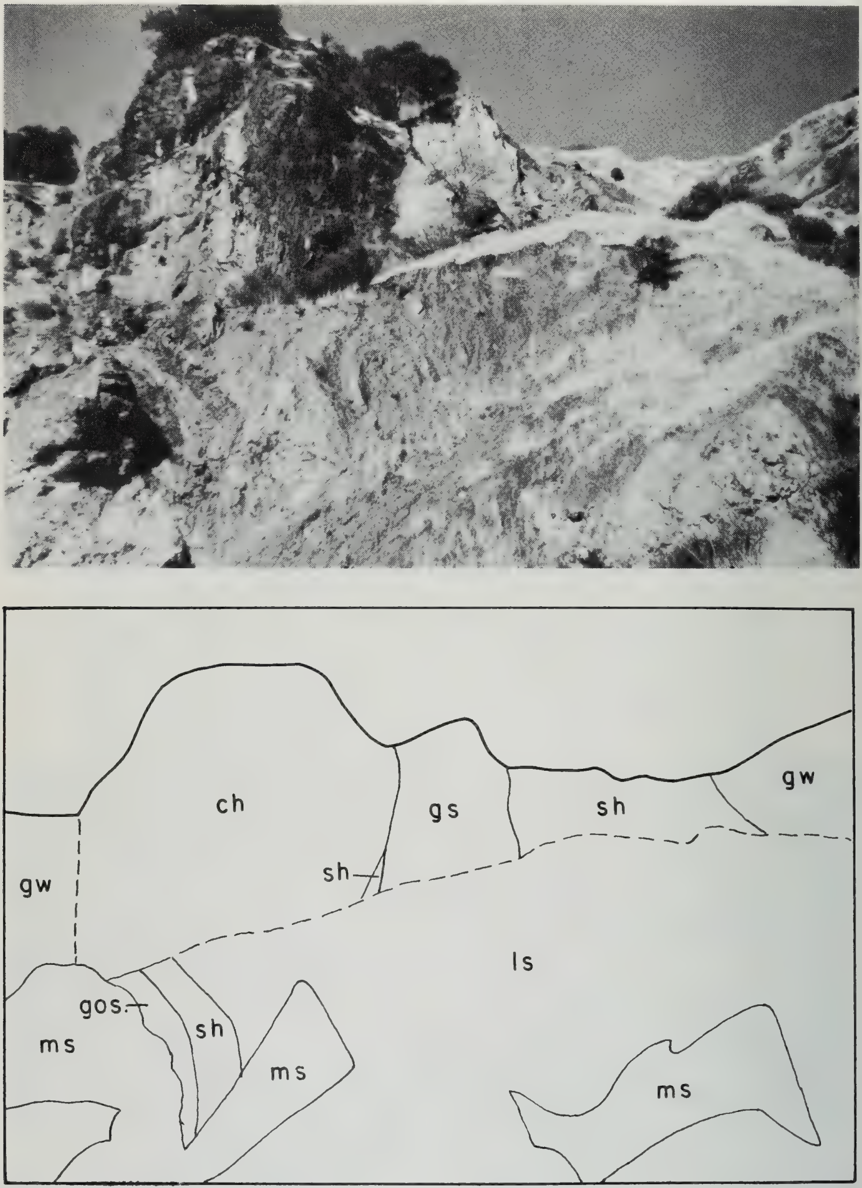

FIGURE 8. *A*. Upper end of landslide in mine area. Chert and glaucophane schist bluff near upper center of the picture. Boulders of sulfide ore in foreground. View toward the north. *B*. Sketch of *A* showing contacts between rock units. ls = landslide; ms = massive sulfide; gl sch = glaucophane schist; sh = shale; gw = graywacke; gos = gossan; dm = dump material; ch = chert.

body was found to be divisible into 6 blocks, each of rather uniform copper content. The results obtained are shown below:

9,000	tons	4.3	percent	copper
2,200	"	3.6	"	"
25,000	"	1.8	"	"
6,125	"	5.0	"	"
30,000	"	0.6	"	"
17,800	"	11.4	"	"

90,125 tons averaging 3.8 percent copper

Sufficient work was not done to estimate the value of the remaining 180,000 tons of undeveloped ore, but on the basis of many other assays, it was believed that the remaining ore would run about the same as the developed ore (Leach, 1911, p. 4). The average of 132,000 tons of ore assayed and obtained in operation from 1915 to 1930 is as follows: Copper 3.296 percent, gold 0.651 oz. per ton, and silver 1.092 oz. per ton.

Mineralization. The primary metallic mineral assemblage of this deposit, consisting of magnetite, pyrrhotite, pyrite, arsenopyrite, chalcopyrite, cubanite, sphalerite, galena, and bornite is typical of deposits that have been formed under conditions of fairly high temperature and moderate depth. Magnetite and pyrrhotite are generally indicative of high temperature. The association of pyrite, arsenopyrite, chalcopyrite, sphalerite, and galena is common in many other types of deposits including the low temperature epithermal deposits. However, the whole assemblage is characteristic of Lindgren's (1933, p. 618) ''pyritic replacement deposit''.

Numerous supergene minerals have been reported from the Island Mountain mine area. Several of these are believed to have resulted from the oxidation of mine dump material containing sulfide minerals; however, most of the supergene minerals are the result of secondary enrichment. Secondary minerals obtained by the writer include: native copper, chalcocite, chalcanthite, malachite, and azurite. Other secondary minerals reported by others are: orpiment, copiapite, fibroferrite, goslarite, halotrichite, melanterite, pisanite, roemerite, coquimbite, bieberite, and morenosite. Gangue minerals include quartz, calcite, and gypsum.

Primary Minerals. Pyrrhotite is the predominant metallic mineral in the remaining part of the ore body examined by the writer. Generally the pyrrhotite is reddish tan and massive except in one or two zones where small anhedral grains from 0.1 mm to 2 mm are found. Typically the grains of pyrrhotite are so small that in polished sections the mineral appears to be one solid mass. Near the upper part of the ore body two types of banded ore are found. The first type consists of bands of fine-grained pyrrhotite and pyrite running through massive chalcopyrite; in the other type, pyrrhotite occurs in small masses roughly alined in bands with chalcopyrite and quartz. Most specimens that appeared to be massive pyrrhotite, when examined with a hand lens, were found to contain some chalcopyrite when studied in polished sections. Several samples of pyrrhotite were checked for nickel and cobalt but no nickel and only a trace of cobalt was found.

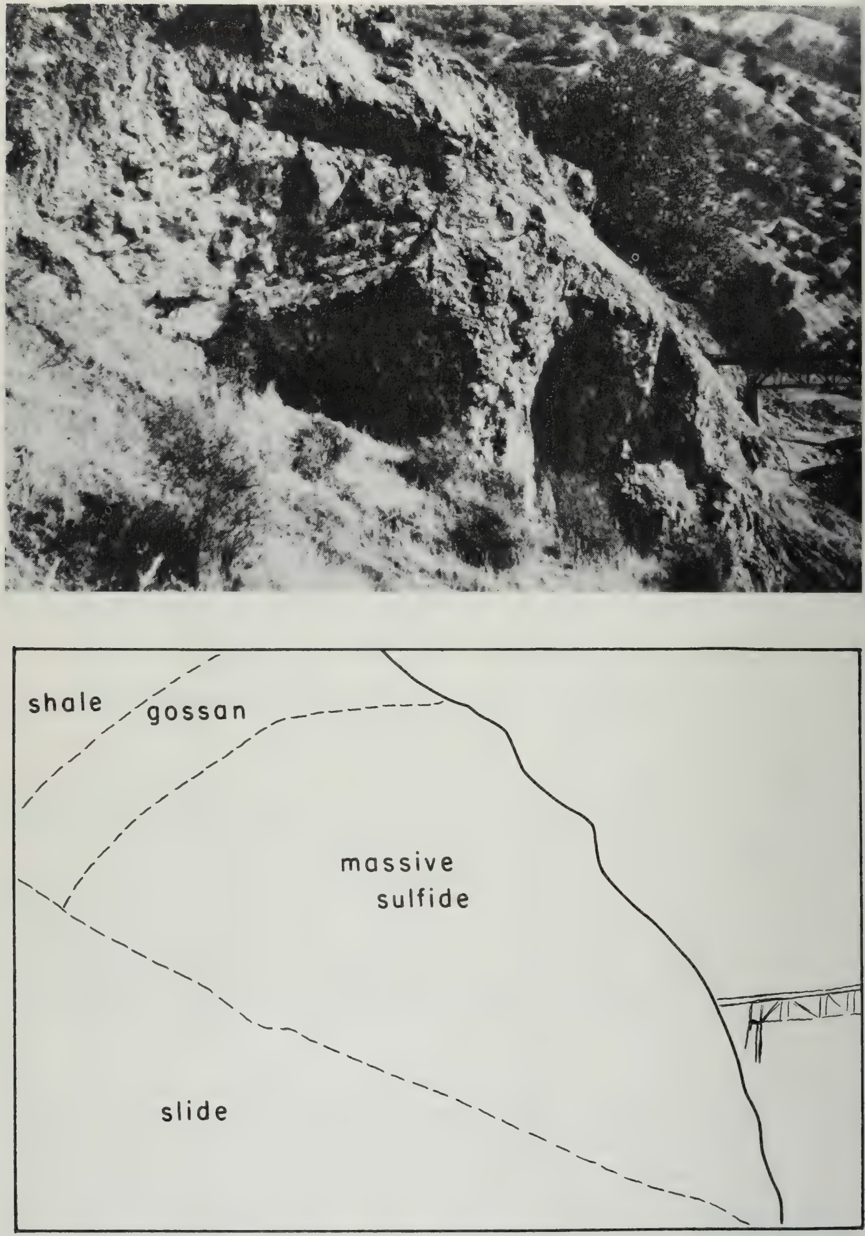

Figure 9. *A*. Lower outcrop of ore body, showing contact between sulfide body and black shale near the upper left corner of the picture. Northwestern Pacific railroad bridge is shown near right foreground. View toward the east. *B*. Sketch of *A* showing contact between shale, gossan, and sulfide ore. Sh = shale; gos = gossan; ore = sulfide ore; sl = slide material.

Pyrite, the next most abundant metallic ore mineral, is found in all parts of the ore body. It is most abundant near the upper borders of the mass of sulfide minerals. Most of the pyrite is pale yellow, anhedral, and ranges in grain size from 0.1 mm to 1 mm. Euhedral crystals of pyrite partly replaced by pyrrhotite and as much as 5 mm in diameter, are abundant in the massive pyrrhotite. Near the outer limits of sulfide mineralization pyrite is interstitial with shale fragments and is locally finely banded. Pyrite also occurs as corroded veinlets in chalcopyrite, as layers of massive pyrite in chalcopyrite, as small masses of radiating crystals which are possibly pseudomorphs after marcasite, and as lamellar masses.

The most important copper mineral at Island Mountain is chalcopyrite, which is generally massive, and occurs as small blebs in pyrite and pyrrhotite, as fine veinlets, and as large patches of nearly solid chalcopyrite. Although chalcopyrite occurs throughout the deposit, it appears to be concentrated in local zones where it is associated with pyrite rather than pyrrhotite.

Magnetite was only found in some of the specimens and ordinarily in minor proportions. In several specimens however, it was fairly abundant. Most of the magnetite seen in polished sections was in the form of small octahedrons, as much as 3 mm in diameter, embedded in arsenopyrite. Because of the high magnetic qualities of some of the specimens, magnetite may be finely disseminated in them.

Only one specimen containing arsenopyrite was available for study. The exact location from which the sample was taken is unknown. In this specimen arsenopyrite occurs as steel-gray bladed crystals as much as 5 mm in length and associated with magnetite and chalcopyrite. Cobalt has been reported [5] from ore of which this specimen is a representative sample, but only a trace of cobalt was obtained by chemical tests and no cobalt minerals were identified by polished section study.

The pale yellow mineral cubanite, identified in some of the polished sections, is associated with chalcopyrite and pyrrhotite. It is ordinarily in small blebs or irregular patches in chalcopyrite, and is found only in specimens from the margins of the ore body.

Galena was not identified in hand specimens, but minor amounts were found in several polished sections of samples obtained near the shale contact. All the galena observed occurred as small blebs closely associated with chalcopyrite. The common grain size was in the range from 0.1 mm to 0.5 mm in diameter.

Interstitial to pyrite and pyrrhotite in several polished sections are small patches and veinlets of sphalerite. All the sphalerite is dark gray or reddish black and no doubt contains a considerable amount of iron. Sphalerite does not occur in quantity and was not identified in hand specimens.

Bornite appears in one polished section as small irregular patches in pyrite, associated with chalcopyrite. This specimen was found near the upper level of the ore body.

No gold, silver, or gold and silver minerals were found in any of the polished sections studied. It seems very probable, therefore, that the gold and silver are carried in one or more sulfide minerals either in solid solution or as a mechanical admixture.

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[5] E. R. Leach, personal communication.

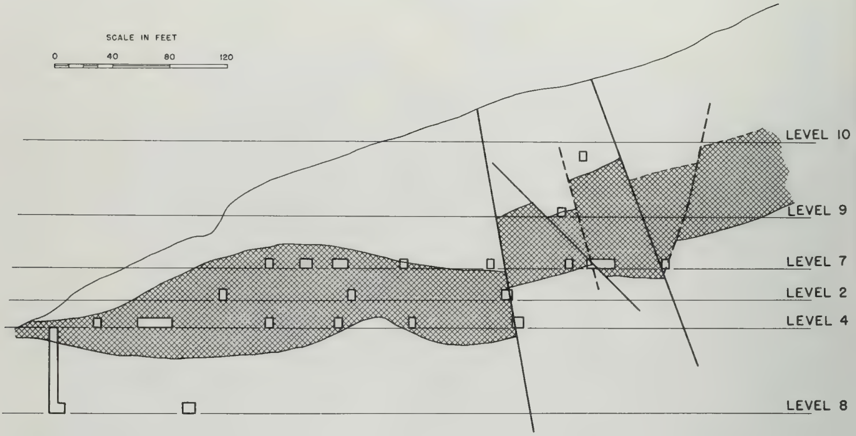

Figure 10. Southeast-northwest longitudinal section. *After A. C. Lawson, 1918.*

Supergene Minerals. The oxidized zone at Island Mountain has been almost completely removed by landsliding. The only remaining mass of gossan material was found near the upper contact of the ore body with the shale. No information was obtainable regarding the original extent of the gossan or its composition; apparently there was no concentration of gold or silver in the gossan as no gold or silver are present in the remaining gossan.

The mass of oxidized material contains the following supergene minerals: chalcocite, native copper, chalcanthite, malachite, and azurite. These minerals occur as coatings on the shale. Some of the native copper occurs as thin partings between shale layers. Chalcocite may be the original supergene mineral, and the other minerals forming as oxidation products. Emmons (1917, pp. 176-177) gives several reactions whereby chalcocite may oxidize to native copper, copper and iron sulfate, and sulfuric acid. This oxidation process possibly has taken place at Island Mountain.

Claudetite is reported (Murdock and Webb, 1948, p. 113) as crusts in the oxidized zone, but none was noted during the present study. Claudetite also occurred as a sublimation product of fires on the dumps containing arsenopyrite.[6]

Other supergene minerals reported as occurring at Island Mountain but which were unverified by the writer include:

Mineral	*Composition*	*Authority*
Orpiment	As_2S_3	(Eakle, 1911, p. 28)
Copiapite	$(Fe,Mg)Fe_4(SO_4)_6(OH)_2 \cdot 20H_2O$	(Murdoch & Webb, 1948, p. 118)
Fibroferrite	$Fe(SO_4)(OH) \cdot 5H_2O$ (?)	(Eakle, 1911, p. 218)
Goslarite	$ZnSO_4 \cdot 7H_2O$	(Eakle, 1911, p. 273)
Halotrichite	$FeAl_2(SO_4)_4 \cdot 22H_2O$	(Murdoch & Webb, 1948, p. 168)
Melanterite	$FeSO_4 \cdot 7H_2O$	(Murdoch & Webb, 1948, p. 206)
Pisanite	$(Fe,Cu)SO_4 \cdot 7H_2O$	(Murdoch & Webb, 1948, p. 232)
Roemerite	$FeFe_2(SO_4)_4 \cdot 14H_2O$	(Landon, 1927, p. 279-283)
Coquimbite	$Fe_2(SO_4)_3 \cdot 9H_2O$	(Landon, 1927, p. 279)
Bieberite	$CoSo_4 \cdot 7H_2O$	(Eakle, 1911, p. 275)
Morenosite	$NiSO_4 \cdot 7H_2O$	(Landon, 1927, p. 279)
Szomolnokite	$FeSO_4 \cdot H_2O$	(Murdoch & Webb, 1948, p. 291)

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[6] E. R. Leach, personal communication.

Gangue Minerals. Gangue minerals occurring with the sulfide minerals at Island Mountain are calcite and quartz. Small veinlets of calcite were observed in several polished sections of the ore. Quartz found in nearly every polished section studied, occurs in two generations. As an early mineral it fills the interstices between the sulfide minerals and the partially replaced shale, and forms small patches in the massive sulfide ore. The proportion of quartz is smaller in the massive sulfide ore and greater in the partly replaced shale. Late quartz is usually found as veinlets between and cutting across the sulfide minerals.

Fibrous gypsum fragments were found in several specimens of partly mineralized shale from near the upper contact of the ore body and the shale. The gypsum occurs as thin partings between the shale beds.

Paragenesis. The metallic minerals appear to have been deposited in several stages. Earlier minerals have been transected and, in part, replaced by succeeding minerals. A single ore specimen seldom, if ever, reveals the whole history of mineralization of a deposit. Although the lack of systematically collected specimens precluded a rigorous study, a few good specimens selected from widely separated parts of the deposit suggest a general sequence of mineralization.

The first mineralizing solutions to enter the area were probably the richest in silica, for silicification of the country rock is indicated in most of the specimens examined. Magnetite seems to be the first metallic mineral deposited. Pyrite was deposited next, but whether or not it overlapped the magnetite in time of deposition has not been satisfactorily proven.

That the next four minerals, pyrrhotite, chalcopyrite, cubanite, and sphalerite, are ordinarily closely associated in space is probably indicative of a close association in time, also. They probably overlap in time of deposition. However, both sphalerite and chalcopyrite cut pyrrhotite in minute veins and do not show the reverse relationship. Cubanite was found in two polished sections where it occurs as exsolution bodies in chalcopyrite.

Minute blebs and local veinlets of chalcopyrite disseminated through the massive pyrrhotite were observed in several polished sections and suggest exsolution. At high temperatures pyrrhotite can hold considerable amounts of chalcopyrite in equilibrium in its structure. This mixture is not stable at lower temperatures however, and if cooling is slow enough the chalcopyrite forms little exsolution blebs (Hewitt, 1938, p. 319). This phenomena also can occur in the formation of chalcopyrite and sphalerite and appears to have happened in these ores. In several of the sections studied, chalcopyrite and sphalerite have developed ''mutual boundaries'' with each other, suggestive of contemporaneous formation. In one or two places it appears that chalcopyrite is replacing sphalerite, which would indicate the persistence of chalcopyrite.

Although galena appears to be deposited contemporaneously with chalcopyrite, most of the galena has replaced chalcopyrite.

Bornite and arsenopyrite are rare and were found in only one polished section and were not in contact with each other.

Because pyrite and quartz are found replacing chalcopyrite, at least two generations of pyrite must be present. This pyrite represents a later generation of pyrite than the pyrite which was replaced by pyrrhotite. Quartz, in turn, has replaced the late pyrite.

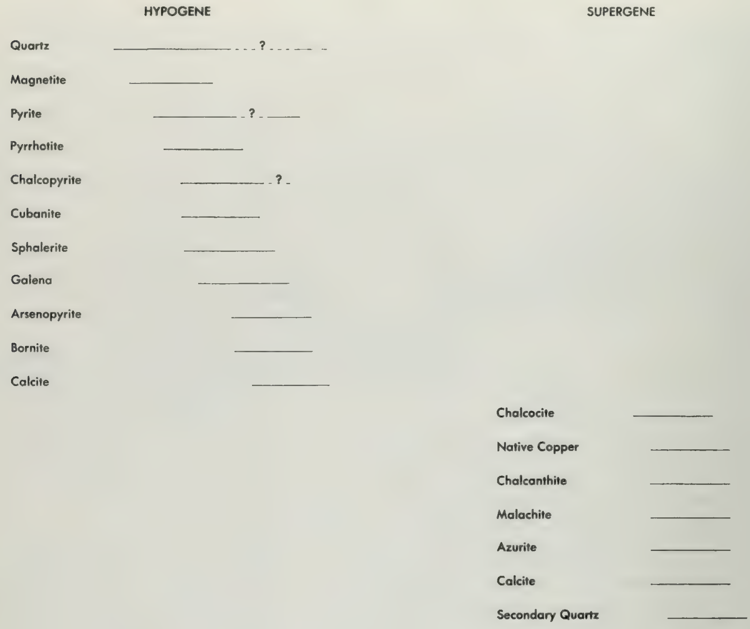

FIGURE 11. Paragenetic diagram.

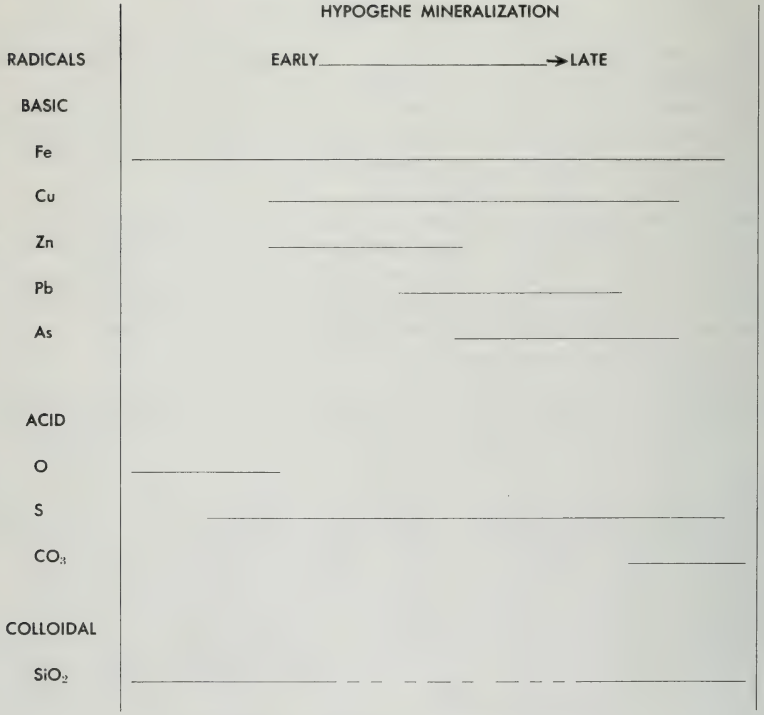

FIGURE 12. Composite paragenetic diagram.

Gold and silver are omnipresent in these ores and are probably carried by the pyrite or chalcopyrite.

Toward the end of mineralization, and probably with a lowering of temperature, calcium carbonate was introduced.

Chalcocite occurs along the boundaries of the bornite or as minute veinlets cutting across the bornite. Chalcocite is clearly secondary in origin and is altered to native copper and other secondary copper minerals.

The accompanying chart shows graphically the time order of introduction of the metallic and non-metallic minerals. This is a qualitative diagram because it would be virtually impossible to assign quantitative values to the various minerals.

Preliminary Magnetometer Survey

In October 1954, the writer with Gordon D. Bath of the Geophysics Branch, U. S. Geological Survey, conducted a preliminary survey of the immediate mine area with an Askania type magnetometer. Although the primary purpose of this survey was to determine whether or not a magnetometer could trace the outline of the ore body buried in landslide debris, enough time was available for several traverses near the upper end of the landslide. During the course of these traverses, an anomaly was obtained which may be indicative of another mass of sulfide ore. The anomaly is located in an area where no ore minerals were previously known to exist. Dr. Bath has provided the following statement on the survey [7]:

> "At the suggestion of Edgar H. Bailey, magnetometer measurements were taken over the old workings of the Island Mountain mine by Gordon D. Bath and Melvin C. Stinson on October 5, 1954 to determine the feasibility of using a magnetic method of geophysical prospecting to detect the buried sulfide bodies that have a high percentage of magnetic pyrrhotite. The old mine workings are covered by talus and dump materials, and the exact size and pyrrhotite content of the sulfide remnants are not known. As shown on traverses A and B in figure 13, higher magnetic readings were found over the inferred positions of remnants than over the adjacent graywacke rocks. Still higher readings were found along the three traverses that are about 300 feet up the slope with highs that coincide with the projection of the mineralized zone.
>
> Of the numerous pieces of rock float that were field tested for rock magnetization, only the pyrrhotite-rich pieces were found sufficiently magnetic to produce the magnetic highs. The susceptibility of the more magnetic specimens was found to be about 0.0025 c.g.s. units. A dike-like body, 50 feet wide with this susceptibility magnetized in the direction of the earth's field and buried to a depth of 10 feet beneath the magnetometer, would have to extend to a depth of 25 feet to produce a 250 gamma high, or extend to a depth of 100 feet to produce a 550 gamma high."

Suggestions for Further Exploration

The structural feature that has been the controlling factor in the localization of mineralization at Island Mountain is a shear zone that extends through the mine area and occurs within the black shale. The shear zone, which can be traced for several miles both northwest and southeast of the known ore body, is the most likely structural guide to other ore bodies. A survey using a magnetometer, gravimeter, or other geophysical instruments may prove fruitful as might the use of geochemical methods such as analyses of soil, water and plants. Further surface exploration would be hindered by the large amount of landslide material covering the shear zone. Other shear zones are widespread in

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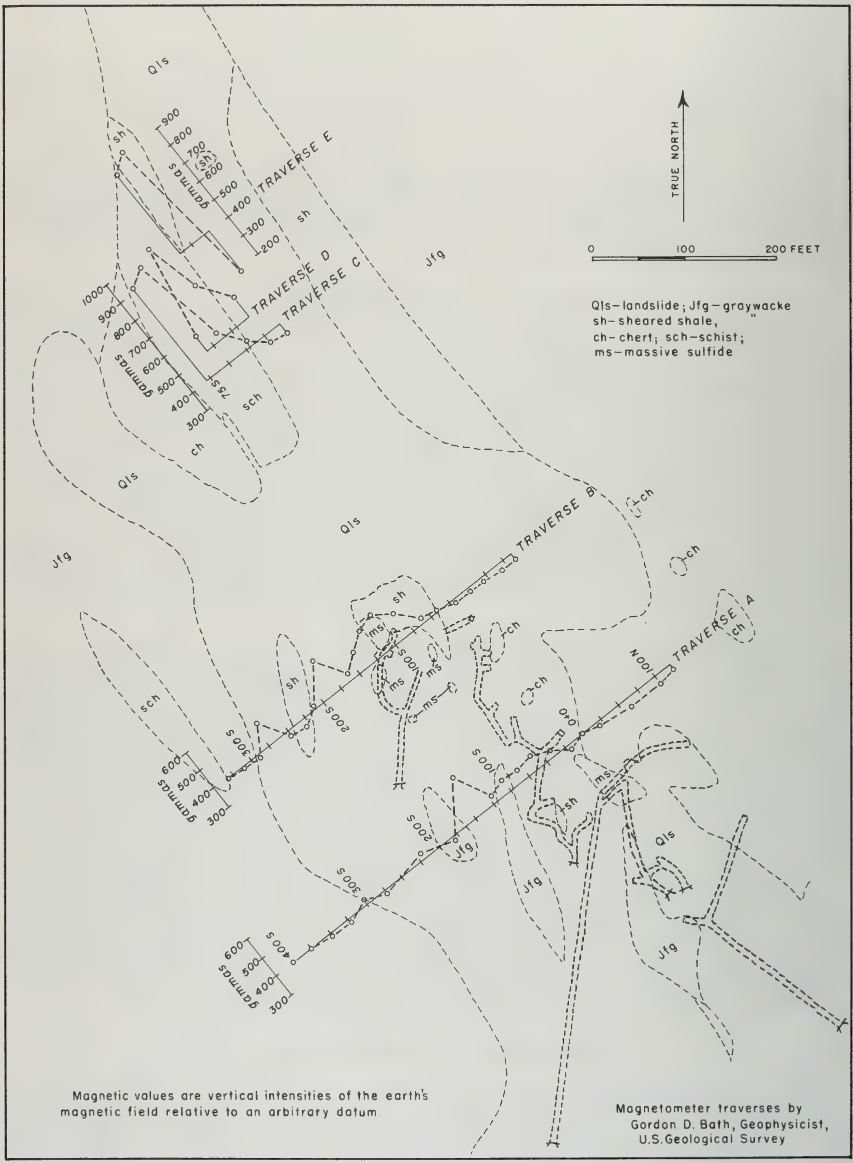
[7] Published by permission of the director, U. S. Geological Survey.


TRUE NORTH
0
100
200 FEET
Qls–landslide; Jfg–graywacke
sh–sheared shale, "
ch–chert; sch–schist;
ms–massive sulfide
TRAVERSE A
TRAVERSE B
TRAVERSE C
TRAVERSE D
TRAVERSE E
gammas
Qls
Jfg
sh
ch
sch
ms
0+0
100N
100S
200S
300S
400S
75S
1000
900
800
700
600
500
400
300
200

Magnetic values are vertical intensities of the earth's magnetic field relative to an arbitrary datum.

Magnetometer traverses by Gordon D. Bath, Geophysicist, U.S. Geological Survey

FIGURE 13. Geologic map of part of the Island Mountain mine area showing magnetometer traverses, outcrops of sulfide ore and underground workings.

the area and may possibly contain bodies of metallic ore minerals buried by landslide debris and soil.

A characteristic of shear zone deposits cited by Butler (1948, p. 4) is the relatively long vertical extent of these deposits. The known ore body at Island Mountain has a very short vertical extent (approx. 100 feet). The possibility that this ore body is only one of several ore shoots extending downward should not be overlooked in future exploration.

A. C. Lawson (1918, p. 4, 5), in his report on the Island Mountain mine, mentioned that in the direction of its dip (east), the limits of the ore body have not been reached by any of the mine workings. He further stated that the boundaries against which the ore had stopped were faults beyond which the ore may reasonably be expected to be found in displaced positions. A survey by geophysical methods to the northeast and east of the known ore body may reveal more ore buried at depth. This survey should also be continued northwest of the ore body because the secondary faults shown by Lawson (plate 4e) displace the northwestern portion of the ore body upward and to the northwest (see fig. 10).

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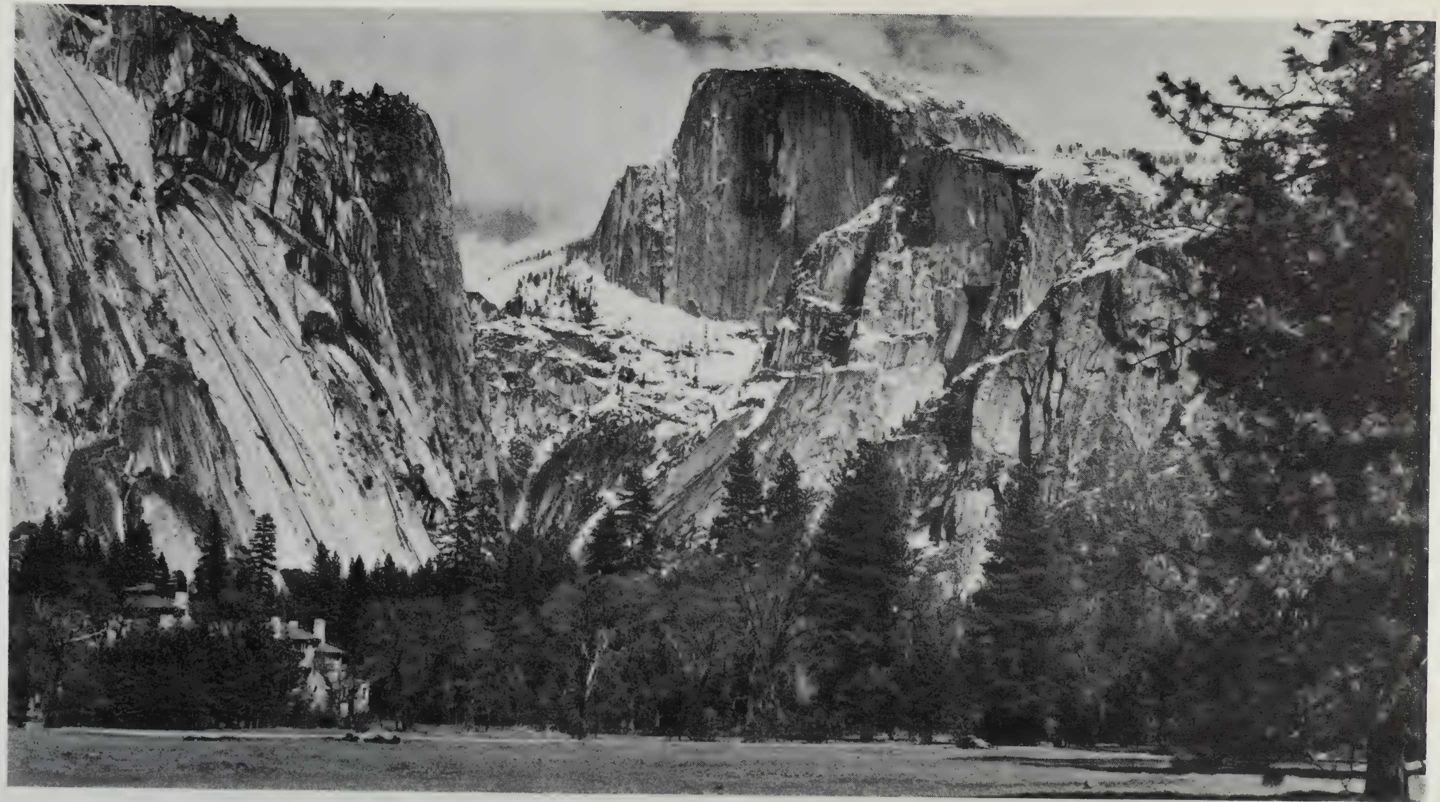

Frontispiece—Half Dome in Yosemite National Park. The valley glacier which in Pleistocene time filled nearly two thirds of the depth of the valley never reached as high as Half Dome. The cliffed face is controlled by nearly vertical joints in the granite, and the rounded, upper surface by gently curving sheet-jointing. *Photo by Mary H. Rice.*

MINES AND MINERAL DEPOSITS OF MARIPOSA COUNTY, CALIFORNIA

By Oliver E. Bowen, Jr.,* and Cliffton H. Gray, Jr.*

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ABSTRACT

Mariposa County, embracing 1453 square miles of sparsely populated territory, lies almost wholly within the Sierra Nevada. From the southwestern boundary, where the terrain has moderate relief bordering the San Joaquin Valley, the county narrows gradually eastward, becomes increasingly rugged and terminates at the crest of the Cathedral Range—part of the glaciated wonderland of the High Sierra. Famous as a gold-mining county from earliest gold-rush days, it is even more noted for its vacationlands of Yosemite Valley, Tenaya Lake, Wawona and Mariposa Grove of giant sequoias.

Approximately three-fifths of the county, from El Portal westward, is underlain predominantly by complexly folded metasedimentary and metavolcanic rocks of Paleozoic and Upper Jurassic age. East of El Portal it is underlain almost wholly by late Jurassic or early Cretaceous granitic rocks. A thrust fault system formed in Upper Jurassic time passes across the county from Mormon Bar northwest to Coulterville. In general this fault system divides areas of Paleozoic and Upper Jurassic rocks, Jurassic rocks lying chiefly west of the fault system and Paleozoic rocks to the east. The fault system has been extensively mineralized by gold-bearing quartz veins which form the famous Mother Lode. Important belts of vein-filled fissures extend for 10 miles on both sides of the Mother Lode and certain fissure systems paralleling the Mother Lode have been mineralized by base metals.

Although primarily a gold-mining country, gold is not the only mineral resource. Substantial quantities of copper, lead, zinc, silver and tungsten have been found in the county and production of base metals is particularly important in wartime. The principal nonmetallic minerals are barite, limestone, dolomite, mica schist, slate, granite, silica, and sand and gravel. More than 20 mineral commodities have been produced in the county, recorded mineral production having reached a peak in 1939 when $1,759,286 was realized from mineral materials. Current mineral production is at the rate of between $200,000 and $300,000 annually.

Gold production, carried on almost continuously since 1848, has totaled more than $24,000,000 since 1880. Total production, including that prior to 1880, although imperfectly recorded, has been estimated at about $48,000,000. The most productive mines have been the Hite, Princeton, Mount Gaines, Pine Tree, and Josephine, Mariposa, Hasloe, Washington, Bandarita, Mary Harrison, Red Cloud and Clearinghouse.

Silver, almost invariably associated with gold in the quartz veins, has added materially to the mineral wealth of the county. Mesothermal quartz veins carrying silver sulpho-salts as the chief primary minerals are found in the Silver Bar and Silver Lane mines near Bootjack.

Platinum, recovered in small quantities in the county from placer gravels, was once the object of extensive search because it was reported to be present in quartz veins near Bagby. No platinum was ever produced from vein sources and the occurrence has not been verified.

Tungsten is widely distributed in the eastern part of the county where it occurs chiefly in limestone and allied carbonate rocks near their borders with intrusive granitic rock. Tungsten deposits were being developed and exploited in the El Portal district in 1954.

Copper mining, although currently inactive, has been important in several past periods and considerable copper reserves remain in the county. Peaks in copper production were reached in 1913 when 416,031 pounds was produced and 1942-1945 when more than 400,000 pounds was recovered.

Production of lead and zinc, which occur together, has been carried on principally in wartime. The Blue-Moon mine produced 50,000 tons of ore averaging 14 percent zinc in 1944-45. There has also been a small wartime production of chromium and manganese ore.

Limestone, quartz, and barite are the three principal non-metallic minerals utilized thus far. Nearly 2½ million tons of limestone were mined from deposits near Incline by the former Yosemite Portland Cement Company for its plant at Merced; these deposits were not depleted; the LeGrand quarry produced 147,964 tons of quartz between 1942 and 1952 for use in the manufacture of ferrosilicon. The El Portal barite mine was the source of 198,613 tons of barite between 1910 and 1948.

INTRODUCTION

Geographic and Cultural Features. Mariposa County was one of the original 27 counties created by the State Legislature early in 1850. It originally included most of Merced, Madera, Fresno, Kings, Tulare, and Kern Counties as well as parts of Mono, Inyo, and San Bernardino Counties (Laizure, 1928, p. 72). At present Mariposa County has an area of 1463 square miles, is roughly triangular, and lies almost wholly within the Sierra Nevada. The long direction of the triangle, oriented northeast, measures about 65 miles, with the southwestern boundary or base of the triangle roughly 35 miles in length.

Along the western edge of the county, which borders San Joaquin Valley, the terrain consists of rolling hills of moderate relief. Toward the northeast the surface becomes increasingly dissected and rugged and relief becomes extreme in the ice-sculptured canyons of the High Sierra east of Yosemite Valley. However, remnants of ancient, low-rolling surfaces still appear in the central part of the county where they stand far above the bottoms of the actively eroding river canyons. Much of the arable land and upland pasture is found on these old surfaces.

The county is drained chiefly by the Merced River and its forks, although tributaries to the Chowchilla River drain the southwestern part. Where the Merced River Canyon debouches onto the plain of San Joaquin Valley, elevations are only 350 feet, but the canyon floor rises to elevations of 4000 feet in Yosemite Valley, and the main stream has its headwaters on Mt. Lyell in Madera County at elevations above 13,000 feet. Parsons Peak, the highest in the county, rises to 12,120 feet.

The population of Mariposa County, numbering slightly over 5100 by the 1950 census, is concentrated chiefly in Mariposa (the county seat), in the Yosemite Valley resorts and in smaller towns scattered

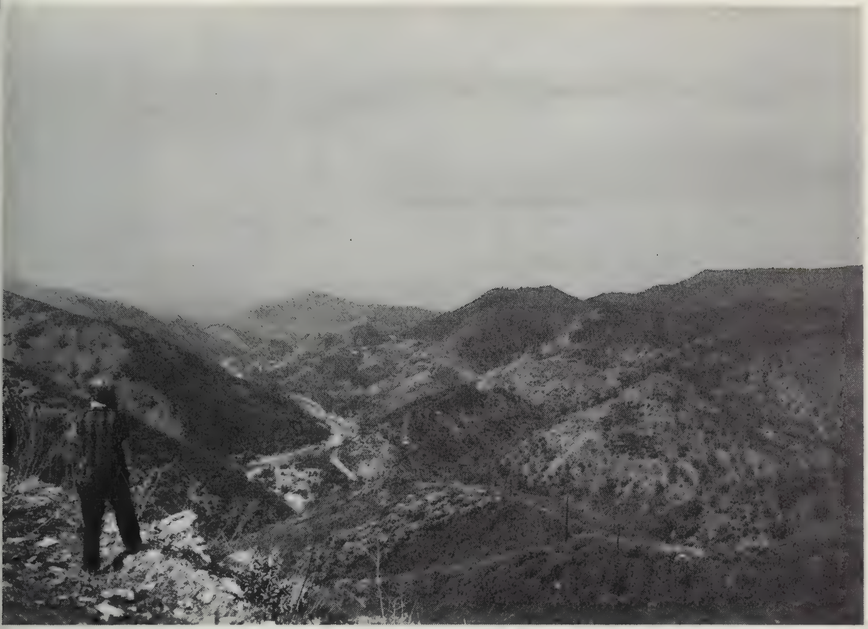

FIGURE 1. The Merced River Canyon as seen from Highway 49 two miles north of Bear Valley, observed from northwest. The youthful, rugged terrain is typified by the v-shaped profile of the canyon. Part of one of the nearly flat, early Tertiary surfaces into which the canyons were incised may be seen along the right skyline. Most of the downcutting has taken place since Miocene time. *Photo by Mary H. Rice.*

along the two chief state highways (140 and 49). From 1907 to 1945 the county was served by the Yosemite Valley Railroad which followed the course of the Merced River from Merced Falls to El Portal. Discontinuance of this line left the county without rail facilities. State Highway 140, the all-year, all-weather route to Yosemite, is the only road through the county adequately engineered for sustained heavy trucking.

Prospecting and mineral exploitation is prohibited in Yosemite National Park. Parts of the county east of Yosemite Valley have proven too rugged and inaccessible to attract mining operators and are largely devoid of mineral deposits. Mining is confined largely to the western two-thirds of the county.

Historical Summary of Mining and Mineral Utilization. The early mining life of the county was identified first with gold and second with copper. Placer gold was discovered sometime prior to 1849, probably by Spanish Californians. Agua Fria and Mariposa Creeks were among the first to be worked. Before the end of the gold rush hardly a gulch within the gold belt had been left unworked by placer miners, and the piles of tailings they left can still be seen in most canyon bottoms. What gold-bearing placer ground was left by these miners was later worked by mechanized dredges. A small amount of platinum was produced as a by-product of gold-dredging operations. Discovery of lode gold in Mariposa County is generally credited to Kit Carson and two

Table 1. Mineral production of Mariposa County 1880-1954.

Year	Total value	Gold, value	Silver, value	Copper, amount and value		Lead, amount and value		Zinc, amount and value		Miscellaneous and unapportioned	
										Value	Substances
1880	$151,317	$150,017	$1,300								
1881	201,200	200,000	1,200								
1882	254,000	250,000	4,000								
1883	223,000	220,000	3,000								
1884	180,000	180,000									
1885	149,277	149,177	100								
1886	197,600	197,600									
1887	185,261	187,165	96								
1888	175,250	175,000	250								
1889	146,021	145,819	210								
1890	124,287	124,265	22								
1891	84,414	84,414									
1892	81,078	81,011	67								
1893	164,423	164,116	307								
1894	153,747	153,708	39								
1895	216,629	216,622	7								
1896	335,817	335,637	180								
1897	452,087	451,427	660								
1898	337,411	336,418	993								
1899	565,636	562,829	2,207							$600	Slate
1900	171,516	157,663	13,853								
1901	542,975	504,928	4,787	191,622 lbs.	$30,180	70,000 lbs.	$3,080				
1902	647,298	631,478	3,880	104,700	11,940						
1903	552,516	542,355	3,353	61,627	6,808						
1904	434,066	429,771	2,829	11,500	1,466						
1905	393,592	386,380	5,231	12,541	1,956					25	Platinum
1906	369,771	366,394	3,377								
1907	410,058	405,498	4,500			1,142	60				
1908	484,112	439,862	4,732	29,124	2,958					36,560	Miscellaneous stone
1909	470,055	396,465	2,729							62,430	Miscellaneous stone
1910	346,245	317,580	2,364							26,301	Miscellaneous stone, barite and unapportioned 1900-1909
1911	175,752	172,532	1,390	14,641	1,830						
1912	214,294	160,541	6,796	284,587	46,957						
1913	246,079	171,034	7,430	416,031	64,485					3,130	Miscellaneous minerals
1914	187,505	131,458	677	277,472	36,904					18,466	Miscellaneous stone, barite, marble
1915	412,326	385,577	2,175	38,630	6,760					17,814	Miscellaneous minerals
1916	487,971	401,718	2,680	162,280	39,930	1,857	128			43,515	Miscellaneous minerals

1917	353,237	313,296	3,221	53,381	14,583	1,075	92	--------	--------	21,046	Miscellaneous minerals
1918	352,504	337,682	5,083	30,294	7,483	[1]	[1]	--------	--------	2,256	Chromite, lead, misc. stone
1919	269,566	253,392	4,139	24,879	4,627	--------	--------	--------	--------	408	Miscellaneous minerals
1920	271,031	261,830	4,705	[1]	[1]	[1]	[1]	--------	--------	4,496	Barite, copper, lead, misc. stone
1921	342,601	331,295	5,251	--------	--------	--------	--------	--------	--------	6,055	Barite, pyrite, misc. stone
1922	226,832	218,571	3,301	--------	--------	--------	--------	--------	--------	4,960	Barite, pyrite, misc. stone
1923	170,911	141,883	1,735	--------	--------	--------	--------	--------	--------	27,293	Barite, pyrite, misc. stone
1924	234,707	182,099	1,608	--------	--------	--------	--------	--------	--------	51,000	Miscellaneous minerals
1925	634,862	192,810	1,758	--------	--------	--------	--------	--------	--------	440,294	Miscellaneous minerals
1926	319,724	182,313	1,518	[1]	[1]	--------	--------	--------	--------	135,893	Barite, copper, pyrite, misc. stone
1927	499,878	183,805	1,376	--------	--------	--------	--------	--------	--------	314,697	Barite, pyrite, slate, granite, misc. stone
1928	282,165	120,568	2,199	[1]	[1]	--------	--------	--------	--------	159,398	Granite, silica, barite, copper, misc. stone
1929	244,017	91,052	651	6,302	1,109	--------	--------	--------	--------	151,205	Barite, silica, misc. stone
1930	143,465	58,985	318	3,690	472	[1]	[1]	--------	--------	83,690	Barite, granite, lead, misc. stone
1931	193,641	88,600	551	[1]	[1]	[1]	[1]	--------	--------	104,490	Barite, copper, granite, lead, silica, misc. stone
1932	379,254	169,627	636	[1]	[1]	[1]	[1]	--------	--------	208,991	Barite, copper, granite, lead, misc. stone
1933	575,118	254,663	1,112	[1]	[1]	--------	--------	--------	--------	319,343	Barite, copper, granite, misc. stone
1934	807,908	517,443	3,214	1,771	142	[1]	[1]	--------	--------	287,109	Barite, granite, lead, misc. stone
1935	875,512	514,544	4,913	2,252	187	1,438	57	--------	--------	353,541	Barite, granite, misc. stone
1936	1,130,018	863,485	4,756	2,350	216	[1]	[1]	--------	--------	261,561	Barite, granite, lead, misc. stone
1937	1,270,774	1,025,010	6,084	11,927	1,443	[1]	[1]	--------	--------	238,237	Barite, granite, lead, mica, pumice, misc. stone
1938	1,588,861	1,081,815	5,154	4,328	424	--------	--------	--------	--------	501,468	Barite, granite, misc. stone
1939	1,755,776	1,296,155	13,181	3,810	396	50,357	2,367	--------	--------	443,677	Barite, granite, misc. stone
1940	1,224,286	949,640	6,615	7,611	861	27,725	1,386	--------	--------	265,784	Miscellaneous minerals

Table 1. Mineral production of Mariposa County 1880-1954.—Continued.

Year	Total value	Gold, value	Silver, value	Copper, amount and value		Lead, amount and value		Zinc, amount and value		Miscellaneous and unapportioned	
										Value	Substances
1941	1,327,594	1,141,070	7,183	5,908	697	7,183	416	---	---	178,228	Barite, mica, misc. stone
1942	1,321,238	1,025,220	6,840	26,973	3,264	15,782	1,057	---	---	284,857	Barite, silica, manganese, misc. stone
1943	443,693	227,115	1,231	---	---	---	---	---	---	215,347	Barite, copper, lead, manganese, silica, tungsten, misc. stone
1944	1,306,411	192,115	82,210	[1]	[1]	255,657	20,453	6,688,655 lbs.	$762,507	224,448	Barite, silica, misc. stone
1945	1,171,094	114,450	68,639	179,848	24,280	236,315	20,323	6,621,320	761,452	181,950	Barite, lead, misc. stone
1946	613,477	122,150	898	[1]	[1]	[1]	[1]	571,137	69,679	420,750	Barite, copper, lead, silica, misc. stone
1947	301,938	222,705	1,749	4,000	840	---	---	---	---	76,644	Barite, silica, misc. stone
1948	280,739	263,375	1,960	---	---	---	---	---	---	15,404	Barite, platinum, slate, misc. stone
1949	325,732	233,835	1,558	200	39	---	---	---	---	90,300	Barite, silica, misc. stone
1950	392,500	236,075	1,801	---	---	2,700	365	---	---	154,259	Granite, platinum, silica, misc. stone
1951	[1]	[1]	[1]	---	---	[1]	[1]	---	---	[1]	Gold, platinum, slate, silver, lead, misc. stone
1952	323,980	23,310	333	---	---	4,300	692	---	---	299,645	Silica, soapstone, misc. stone
1953	223,006	24,185	117	---	---	---	---	---	---	198,704	Miscellaneous minerals
1954	104,366	14,420	205	---	---	800	110	600	65	89,566	Miscellaneous minerals
Totals	$33,200,032	$23,837,047	$345,224	1,974,279 lbs.	$313,237	676,331 lbs.	$50,586	13,881,712 lbs.	$1,593,703	$7,025,839	

[1] See under "Miscellaneous and unapportioned."

associates who located the Mariposa mine in the spring of 1849. However, presence of early day arrastras suggest that the Spanish Californians may have milled the first lode gold. By July of 1849 a stamp mill had been erected and was processing ore from the Mariposa mine (Logan, 1934, p. 184). A more elaborate stamp mill was built at the Jenny Lind mine near Hornitos in 1851 (Bowen and Crippen, 1948, p. 38). Although more elaborate crushing devices, such as the Huntington mill and various ball mills, were later developed and used extensively in Mariposa County, use of stamp mills has persisted to the present day.

Perhaps the greatest single influence on early-day gold mining in Mariposa County was John C. Fremont's Spanish land grant, Las Mariposas, containing 44,387 acres. Included in Las Mariposas was 12 miles of Mother Lode veins (extending from Merced River to Mariposa) as well as numerous other East Belt and West Belt properties. Gold was discovered on the grant before Fremont had established clear title to it and mines within its confines were involved in court actions and even in bloody battles over a period of ten years after discovery of gold. Largely unsurveyed and, because of grant title, not subject to mining laws of the day, the mining properties had indefinite boundaries and are difficult to locate on maps to this day. The Mariposa Mining and Commercial Company, organized by San Francisco financial giants Hayward, Flood, Mackay, Jones, and others in 1887 (Bradley, 1954, p. 32) took over the management of Las Mariposas and the Company was not wholly liquidated until after World War II. Internal dissension and inefficient management of the grant at some times during its existence probably retarded development of its gold properties and lowered the total gold production of the county through the years (Bradley, 1954, p. 32). Nevertheless, about 15 million dollars was produced from mines of Las Mariposas, nearly one-third of the estimated gold production of the county.

Another large property which figured prominently in Mariposa County gold mining was the 20,000-acre Cook Estate astride the Mother Lode in the Coulterville area. Operations of the Merced Gold Mining Company which took over holdings of the Cook Estate in 1895 lasted until near the close of World War I. The Cook Estate included most of the prominent mines in the Coulterville area.

Copper was discovered in Mariposa County sometime during early gold rush days but little or no mining of copper went on until 1863. By 1868 (Browne, 1868, p. 218) there were three copper smelters in Mariposa County, one each at James Ranch, Bear Valley and Hunter Valley. A drop in the price of copper in 1868 ended the first period of copper-mining activity. Other periods of activity in copper were 1901-1919 and 1929-1946. There have been few shipments of copper ore in recent years.

Mining of other base-metals in Mariposa County has been carried on largely during war years, although small amounts are produced intermittently as by-products of gold mining. Government price supports and the stockpiling program have stimulated some interest in strategic minerals such as tungsten, chromium and manganese. Tungsten is the most actively sought-for metal in the county with the possible exception of uranium. Commercial deposits of uranium have not been found.

Mariposa County has contributed to the construction industry since 1850. Soapstone, quarried at Greeley Hill (Heizer and Fenenga, 1948, p. 103) and used for building facings in Coulterville, and granite blocks quarried at Mormon Bar and used in the Mariposa jail, are among the earliest materials processed in the county. Many of the buildings erected during gold rush days were built of slabs of field stone, available in most parts of the county. Production of roofing slate dates back at least to 1897 (Aubury, 1906, p. 152). There are large reserves of black slate of good quality in the county but throughout most of California's history roofing slate has been unable to compete with lower-cost roofing materials. A material increase in population of the Central Valley towns might revive slate quarrying to supply flagstone and allied materials. There is a small production for such purposes. Colored materials for terrazzo chips and roofing granules are in considerable demand. There is a small production of green serpentine for terrazzo chips from a quarry north of Bagby.

Production of limestone began in Mariposa County in 1927 with the opening of the Yosemite Portland Cement Company plant at Merced (Merced County), and the establishment of quarries north of the Merced River between Jenkins Hill and Incline. These quarries remained active until 1944 when the Yosemite Valley Railroad ceased to function. Limestone reserves were not materially depleted, although more than 2,400,000 tons of limestone was removed.

Barite mines near El Portal produced throughout most of the period from 1910 through 1948. The El Portal barite mine produced 398,613 tons of barite during this period, about 70 percent of the total California production. Substantial reserves remain in the El Portal mine; the mill is still functional and mining may well be resumed.

The existence of large numbers of veins of nearly pure quartz in Mariposa County have attracted manufacturers of refractories and ferrosilicon in recent years. From 1942 to 1952 147,964 tons of silica was produced from the LeGrand (White Rock) silica quarry for use in manufacture of ferrosilicon. There had been a small intermittent production of silica prior to 1942 and a little has been mined since 1952.

Acknowledgments. The authors are particularly indebted to Walter D. McLean and John P. Fulham who supplied much valuable information on mines in the Coulterville and Colorado-Sherlock Creek-Whitlock Creek districts, and who kindly criticized parts of the manuscript. Much valuable information on the Hornitos district, particularly on the Mount Gaines mine, was supplied by Francis H. Frederick.

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GEOLOGY

General Geologic Features

The western two-thirds of Mariposa County is underlain chiefly by metasedimentary and metavolcanic rocks of Palezoic and Upper Jurassic age. Among the metasedimentary rocks, slate, quartz-biotite hornfels and quartz-biotite-graphite schists predominate, but there are some large masses of limestone, chert, dolomite and quartzite. Metavolcanic rocks are predominantly greenstones and green schists derived from submarine-laid pyroxene andesite and basalt. All of these metamorphic rocks have been intruded in late Mesozoic time by a variety of granitic and peridotitic igneous rocks, among which biotite-hornblende granodiorite is the predominant type.

The eastern third of the county is underlain mainly by intrusive granitic rocks of late Jurassic or early Cretaceous age varying in composition from hornblende gabbro to biotite granite. Hornblende biotite granodiorite, biotite quartz monzonite and biotite granite are most common. The granitic suite of rocks is exceptionally well-exposed in the walls of Yosemite Valley.

The metamorphic rocks in general form broad northwest-trending belts. They are so distributed because they have been thrown into a series of acute, commonly isoclinal, northwest-trending folds by compressional forces acting essentially from the northeast and southwest. The Mother Lode thrust-fault system which trends northwest across the county from the vicinity of Mariposa through Coulterville, nearly everywhere divides Paleozoic and Upper Jurassic rocks. Those east of the fault system, although not studied in detail thus far, are largely of Palezoic age whereas those to the west are Upper Jurassic. This would indicate that the entire Upper Jurassic stratigraphic section, which once aggregated at least 20,000 feet, has been uplifted and eroded from the block lying on the east side of the fault. The Mother Lode fault system in Mariposa County is not a single vein-filled fissure but rather is a series of essentially parallel to en-echelon breaks. For several miles in the Peñon Blanco district a single, vein-filled fissure stands out from among all other veins in the area. In other parts of the county the Mother Lode is hard to define. Many of the most productive veins in the county are not directly related to the Mother Lode fault system although they formed under similar conditions and at about the same time.

Rock Units

Thus far the Paleozoic rocks have not been subdivided into units. Turner and Ransome (1897, pp. 4, 5) described all of the metasedimentary rocks of probable Paleozoic age in Sonora quadrangle under the name Calaveras formation. More recently these rocks have been referred to as the Calaveras group (Taliaferro, 1943, pp. 281-282). The

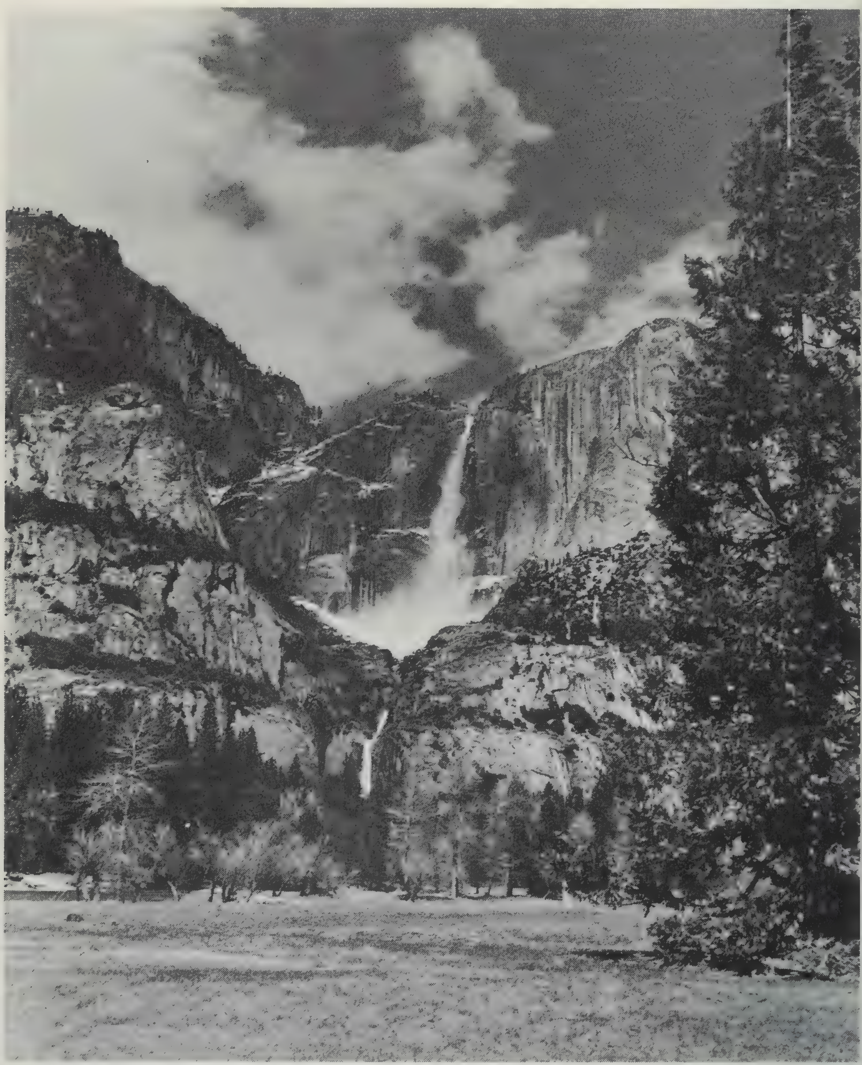

FIGURE 2. Glaciated walls of Yosemite Valley in the High Sierra over which Upper and Lower Yosemite Falls tumble. The gently inclined surfaces covered with trees have formed along joint systems in the granite. *Photo by Mary H. Rice.*

Paleozoic rocks in the very fine section exposed along the Merced River east of Bagby probably could be divided into several slate and one or more carbonate, chert and greenstone units. Carbonate rocks were the only units separately mapped under the Calaveras formation by Turner and Ransome.

Taliaferro (1943, pp. 283-285; 1951, p. 120) divides the Upper Jurassic rocks along the Merced River west of Bagby into an upper formation, the Mariposa slate, at least 6000 feet thick, and a lower, predominantly volcanic series below it, the Amador group, totaling nearly 15,000 feet. He subdivides the Amador group into five units, oldest to youngest: the lower volcanics of unknown thickness, the pillow basalts (1200 feet thick), the Hunter Valley chert (lenticular, 950 feet thick, maximum), the Peñon Blanco volcanics (chiefly greenstone, 9000+ feet thick) and the Agua Fria volcanics (3500 feet thick). The Hunter Valley chert and the pillow basalt units thin out south of the Merced River and neither are present in the section exposed along the Mt. Bullion-Merced Falls road.

Calkins (1930, pp. 120-129) has subdivided the granitic rocks of the Yosemite region into 13 units: the Johnson granite porphyry, Cathedral Peak granite, Half Dome quartz monzonite, Sentinel granodiorite, Bridalveil granite, Leaning Tower quartz monzonite, Taft granite, El Capitan granite, granodiorite of the Gateway, biotite granite of Arch Rock, diorite and gabbro, porphyry of Red and Gray Peaks, and the Mount Clark granite. Rocks similar to these units occur elsewhere in the county but are as yet unnamed and uncorrelated. In addition to the rock types just listed there are small masses of gabbro, diorite, quartz diorite, and olivine norite as well as lamprophyres and hornblende porphyries. All of these belong to the Jura-Cretaceous suite of granitic rocks. Also belonging to this group is a rare dike-rock, albitite, composed almost entirely of albite feldspar. In the Flyaway Gulch district albitite is associated with quartz veins and in a few mines is the host rock for gold-bearing ore-shoots.

Another important suite of intrusive igneous rocks, emplaced somewhat earlier than the granitic series but also of Upper Jurassic age, is the peridotite group—most bodies of which are thoroughly serpentinized. Saxonite and dunite were the principal types of peridotite that formed prior to serpentinization, but within the large masses of serpentinized peridotite are small segregations of gabbro, norite, pyroxenite, hornblendite and chromite. Two large, lenticular masses of the serpentine rocks are found adjacent to the Mother Lode from Bagby to Coulterville. The more southerly of the two extends north from Bagby a distance of 6 miles and reaches a maximum width of about 2 miles.

Two groups of contact metamorphic rocks are worthy of special consideration inasmuch as they are potential sources of economic minerals. These are the contact-altered slates and carbonate rocks. Where large masses of granitic rock have intruded slate, well-defined alteration zones commonly develop. These are particularly conspicuous in western Mariposa County. Approaching a granitic contact there is a regular progression from uniform slate as follows:

Stage 1. Spotted slate with small dots of biotite mica, cordierite or quartz, singly or together.

Stage 2. Knotted, glossy slate or phyllite with larger clots of the above minerals and (or) indistinctly formed chiastolite or well-formed andalusite crystals in a groundmass characteristically containing sericite mica and graphite.

Stage 3. Spotted to knotted schist with well-crystallized, micaceous groundmass material plus large clots or large crystals of andalusite, cordierite, quartz, etc.

Stage 4. (Nearest the granite) Dense, horn-like rock, called hornfels made up chiefly of small, irregular-shaped crystals of quartz and biotite with minor sillimanite or andalusite.

Some andalusite-bearing slates and schists in western Mariposa County are possible sources of refractory aluminum silicate.

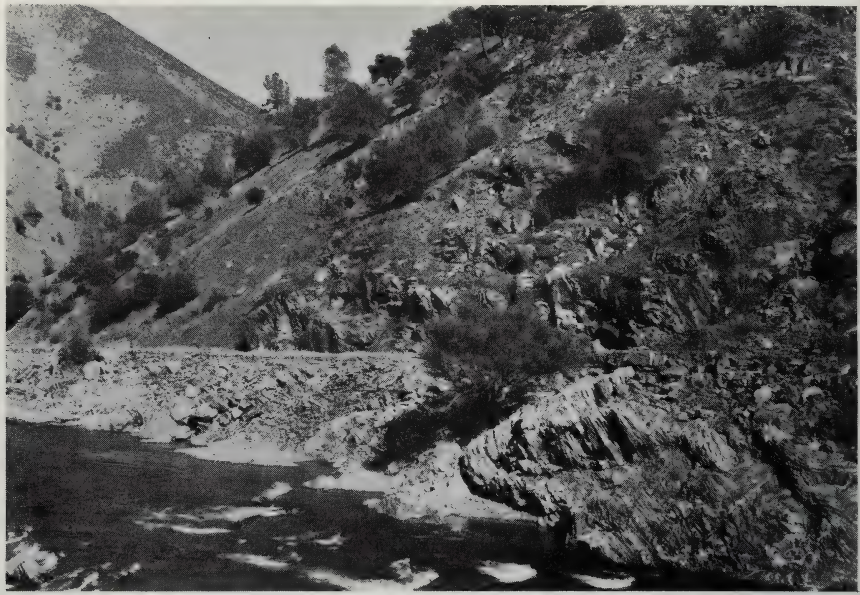

FIGURE 3. Contorted chert and slate of the Paleozoic Calaveras group in Merced River Canyon between Briceburg and Clearinghouse. The cherts and limestones of the Calaveras group although perhaps the most conspicuous, form only a minor part of the predominantly metasedimentary sequence. Slate derived from shale and schist derived from shale, siltstone, and sandstone are the most common rock types in the Calaveras group. *Photo by Mary H. Rice.*

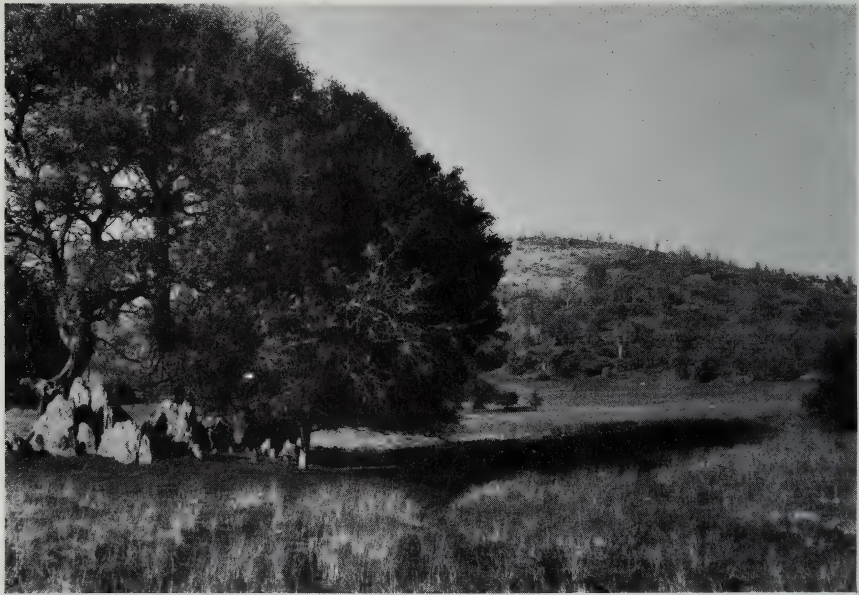

FIGURE 4. Tombstone rocks of andesite greenstone protruding through soil cover on a highland meadow in the Buckhorn Peak district 7 miles southeast of Coulterville. The greenstone sequence in this vicinity has been long considered to be part of the Paleozoic Calaveras group but may possibly be similar in age to the greenstones of the Amador group. *Photo by Mary H. Rice.*

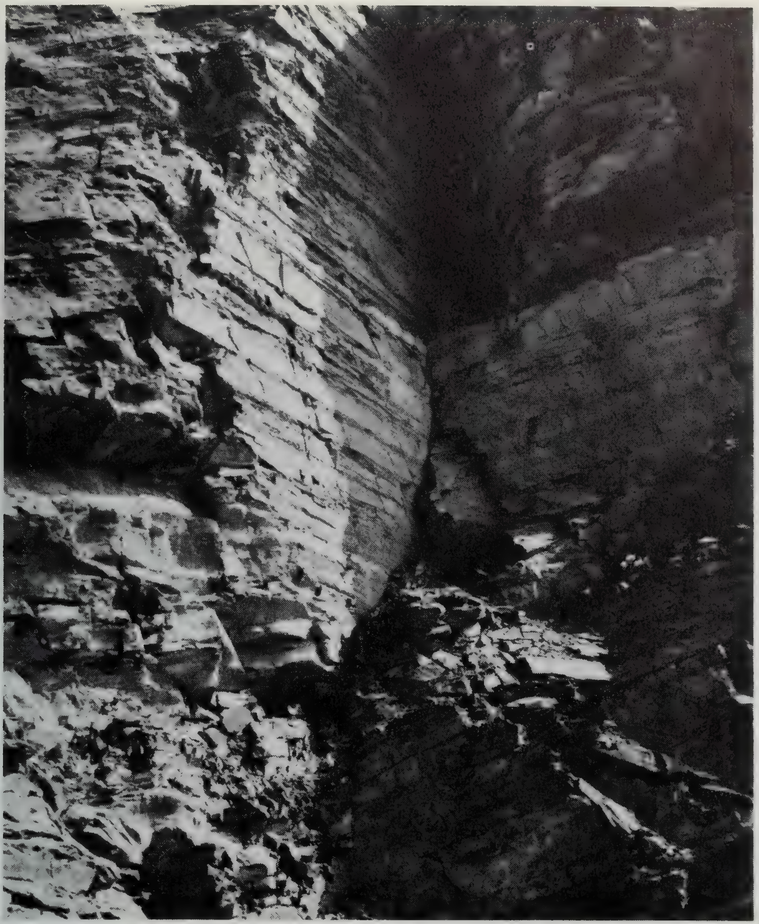

FIGURE 5. A typical outcrop of weathered, laminated slate of the Upper Jurassic Mariposa formation as seen in a roadcut along Highway 49 in Hell Hollow 1 mile south and slightly west of Bagby. The clay shale from which it is formed has been recrystallized by heat and pressure into a glossy, black, cleavable rock made up chiefly of micas, graphite, and quartz. *Photo by Mary H. Rice.*

Silicated zones have formed along contacts where granitic rocks have invaded carbonate rocks; they commonly contain suites of calicum and magnesium-bearing minerals such as garnet, diopside, epidote, tremolite and wollastonite. It is in such mineral assemblages, called tactite rock or skarn rock, that tungsten minerals most frequently occur. Most of the promising tungsten deposits in the county are in rocks of this sort.

Tertiary rocks are found in Mariposa County in isolated patches only. Erosion remnants of the middle Eocene Ione formation are found along the western border of the county in the vicinity of Merced Falls where they do not exceed 100 feet in thickness. Coarse, red sands and gravels, coarse white- to cream-colored andalusite-anauxite sands and a little fine, white quartz sand are the conspicuous rock types in the Ione formation in Mariposa County. Three isolated patches of Eocene river-channel gravels have been found in the county, two astride the

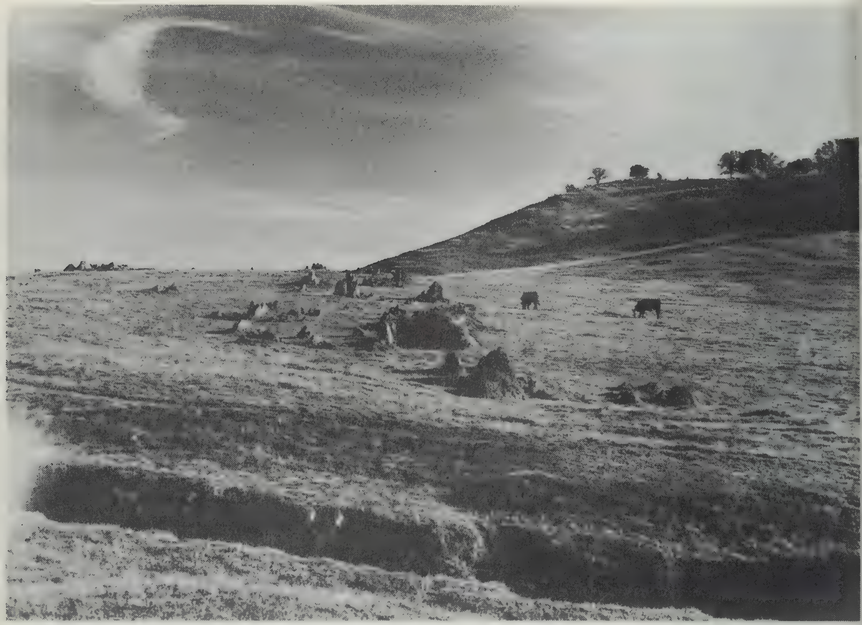

FIGURE 6. A typical pasture scene in western Mariposa County along the Hornitos-Merced Falls road. In this place the tombstone-like rocks are tuffaceous slate of Upper Jurassic age, probably part of the Mariposa formation. *Photo by Mary H. Rice.*

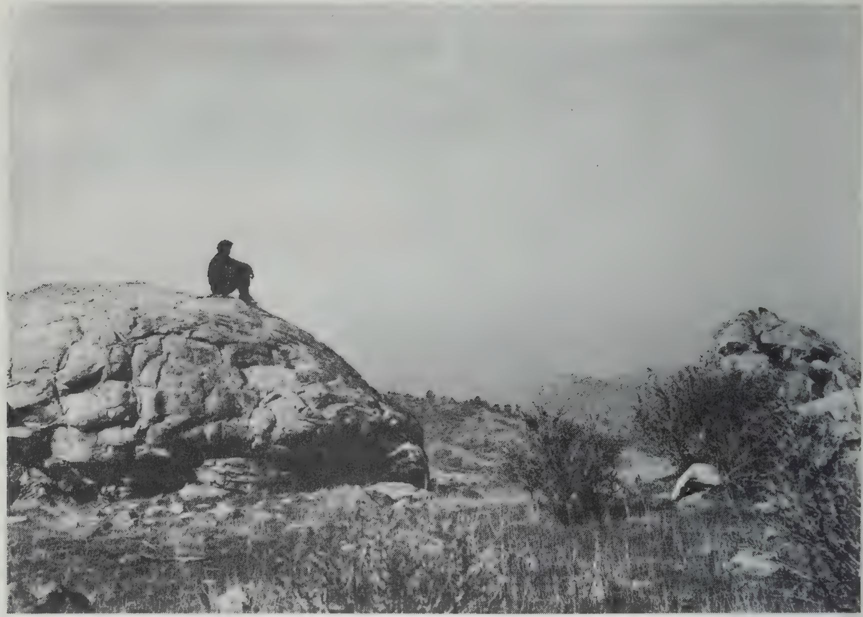

FIGURE 7. Bouldery outcrops of massive pyroxene andesite greenstone as seen along the Bear Valley-Hornitos road 3 miles west of Bear Valley. Massive outcrops of this kind are generally agglomerate or, less commonly, intrusive masses of coarse-crystalline rock. In this instance they are parts of the Peñon Blanco member of the Upper Jurassic Amador group. *Photo by Mary H. Rice.*

north county line. One is a mile northwest of Buck Meadows Lodge on Highway 120, another is west of Lake McClure two miles northwest of Fortynine Gap, and the third is northwest of Bower Cave in the Jordan Creek vicinity. A small patch of Pliocene andesite tuff overlies the Eocene channel gravel near Buck Meadows Lodge.

The most important Quaternary deposits are the glacial moraines scattered through the eastern part of the county and the lakebeds on the floor of Yosemite Valley. Isolated patches of terrace gravels are found along the Merced River and its tributaries.

Geologic History

The earliest record upon which to base the geologic history of this part of the Sierra Nevada lies in the Paleozoic metamorphic rocks. These are marine sediments and possibly some submarine volcanic rocks, indicating that marine waters covered the land for a long period of time. A thick sequence of shale, limestone, chert (in some places manganiferous), sandstone and andesitic volcanic rocks accumulated which later was transformed by heat and pressure into the slate, crystalline limestone, metachert, quartzite and greenstone seen today. Inasmuch as the degree of metamorphism is greater among the

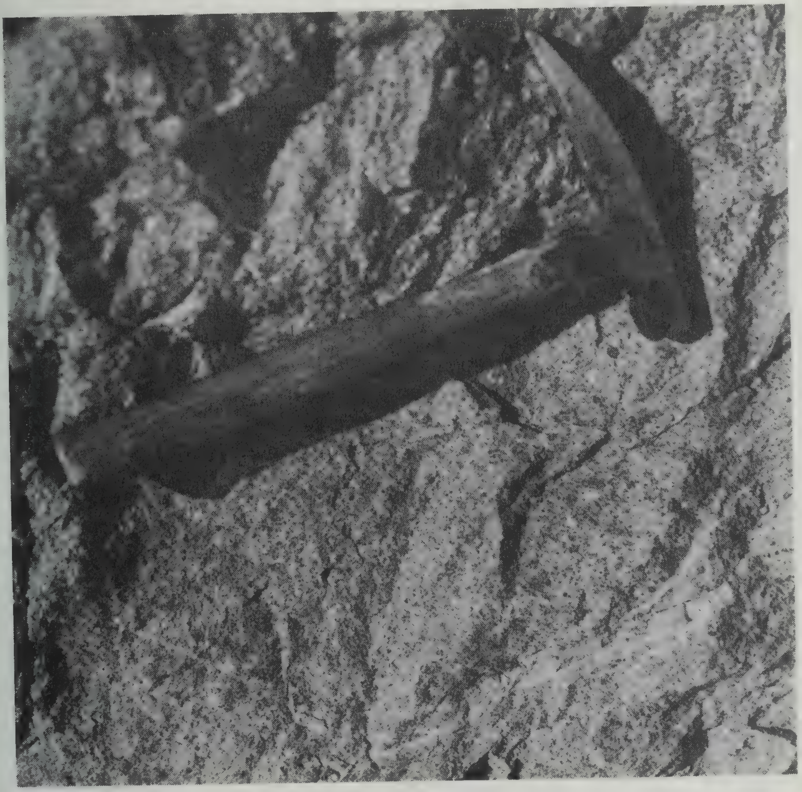

FIGURE 8. Closeup of one of the coarse-grained, intrusive facies of the Peñon Blanco pyroxene andesite greenstone. The speckled appearance is caused by black crystals of altered pyroxene. Pick handle is 12 inches long. *Photo by Mary H. Rice.*

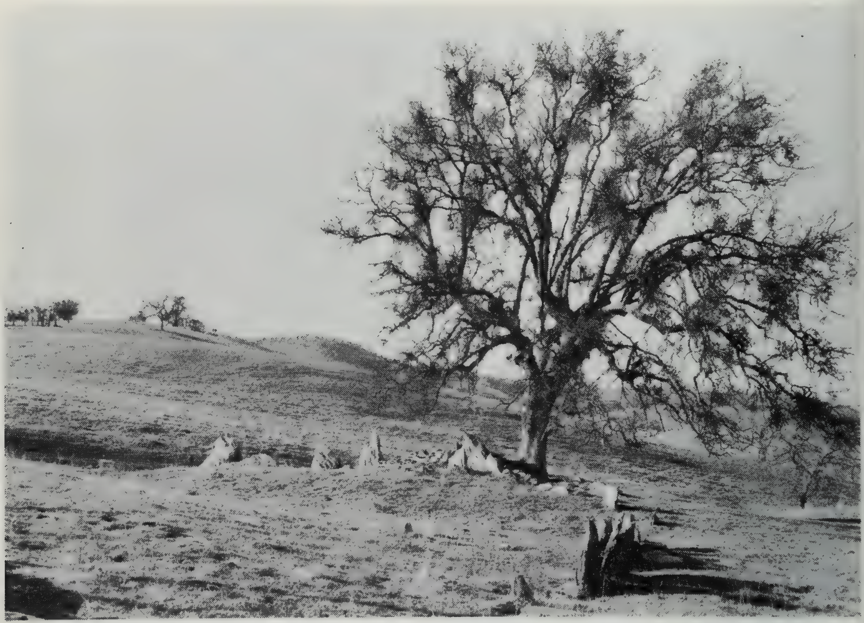

FIGURE 9. When the greenstones similar to those shown in figures 7 and 8 have been strongly sheared during metamorphism they crop out in the tombstone-like forms pictured above. Hornitos district. *Photo by Mary H. Rice.*

Paleozoic rocks than among the younger Jurassic rocks, two metamorphic episodes may have taken place, and the crustal motion involved in the first episode may have raised the Sierran area above sea level.

Triassic rocks are unknown in the Mariposa County portion of the Sierra Nevada. The base of the Amador group rests unconformably on Paleozoic rocks, showing that a period of erosion preceded deposition of the Jurassic rocks. Consequently, much of the area of the Sierra Nevada must have been above sea level and actively eroding during Triassic and Lower Jurassic time. By Middle Jurassic time much of the Sierran area had again fallen below sea level, and 15,000 feet of predominantly submarine volcanic material was piled onto the old erosion surface. The manganiferous cherts originated as sea floor chemical precipitates from a volcanic source and became interbedded with the volcanic sequence. Part of the Mariposa formation, which is essentially slate, was laid down during the waning period of volcanism, and locally the lower part of the formation contains interbeds of volcanic material. Most of the 6000-foot thickness of the Mariposa formation is, however, a monotonous sequence of graphitic slate derived from organic clay shale, and its homogeneity is broken only locally by lenticular sandstone and conglomeratic layers.

Following deposition of the Mariposa formation, the series of crustal disturbances began which resulted in rise of the ancestral Sierra Nevada. Prior to warping of the rocks above sea level, the marine sedimentary and volcanic deposits were invaded by dikes, sills, and irregularly shaped masses of peridotite. These were either serpentinized as they were emplaced or were altered soon after. Chromite deposits were formed as segregations in the original peridotite. The ancestral Sierra Nevada, less lofty than the current mountain chain, nevertheless covered a much broader area, extending at least half way across what is now our Central Valley. During folding, large masses of granitic rock were emplaced in the core of the range. The crustal deformations involved in the folding resulted in deep-seated fracturing and faulting of the metamorphic roof rocks as well as the outer granitic core. Thus part of the vapors and solutions given off at the time of invasion of the granitic rocks could rise upward and be deposited in the fractures. Such is the origin of the gold-, silver-, copper-, lead- and zinc-bearing veins in Mariposa County.

A long period of erosion followed the rise of the ancestral Sierra Nevada. During this time the mountains were greatly reduced in elevation and in area, the metamorphic roof-rocks being deeply eroded, and the veins and ultimately the granitic core of the range laid bare. Gold and the other heavy minerals of the veins and roof rocks became concentrated in stream deposits or in deltaic deposits at the edge of the western sea. Erosion of the rocks was aided greatly by the chemical decomposition characteristic of tropical climates, tropical conditions

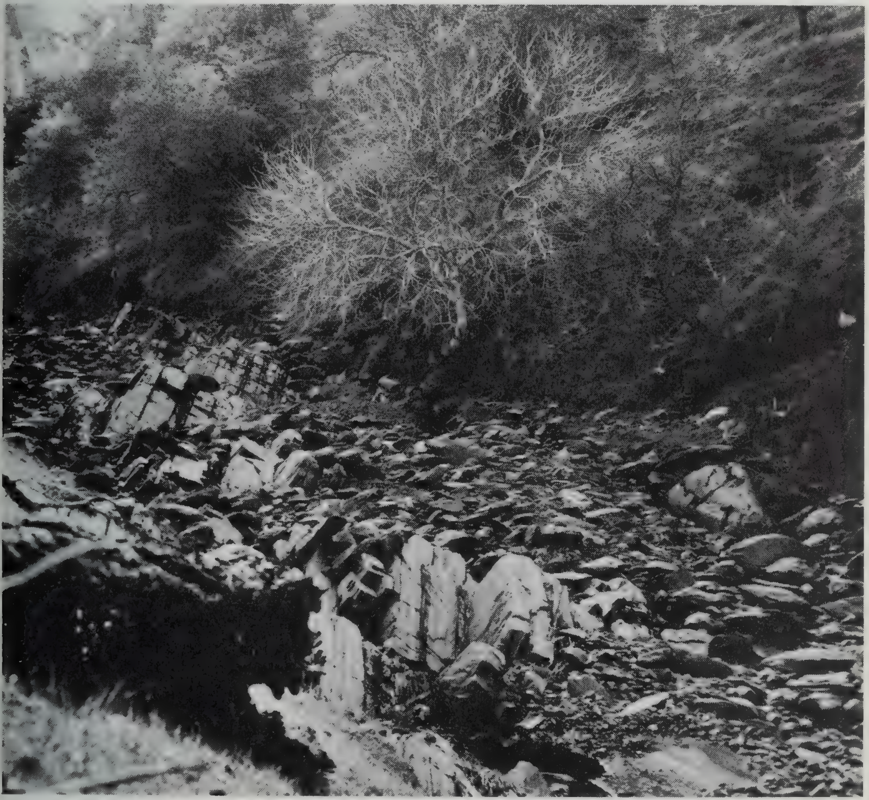

FIGURE 10. Platy, laminated metasediments of the Hunter Valley chert member of the Upper Jurassic Amador group in the bottom of Temperance Creek just west of the Hunter Valley road. *Photo by Mary H. Rice.*

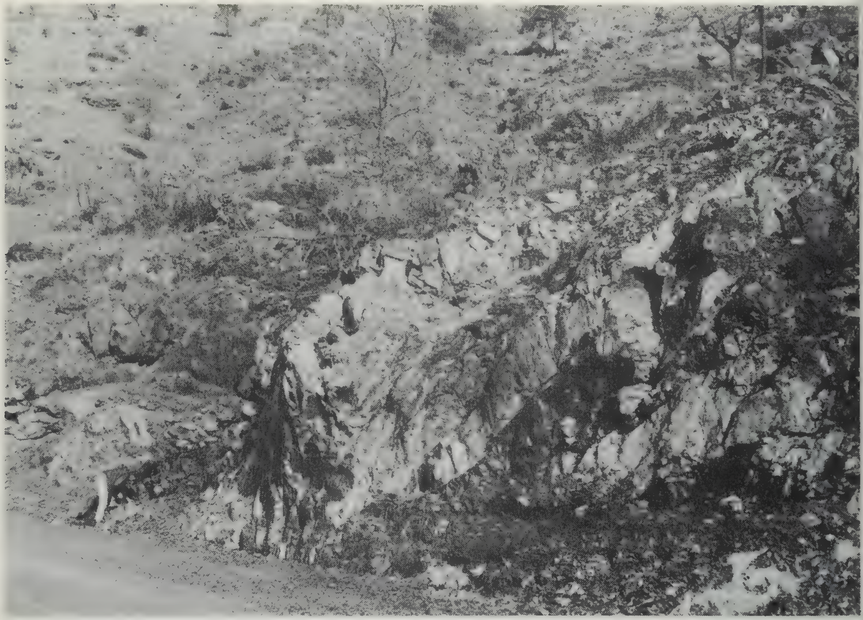

FIGURE 11. Serpentine terrain along the Bagby Grade of Highway 49, about 3 miles northwest of Bagby. The strongly fractured rock, on which there is virtually no soil cover, supports a sparse growth of digger pines and scattered toyon or California holly. Fires have reduced the already sparse growth to a degree suggestive of an arid region. Rainfall here, however, averages well over 20 inches a year. *Photo by Mary H. Rice.*

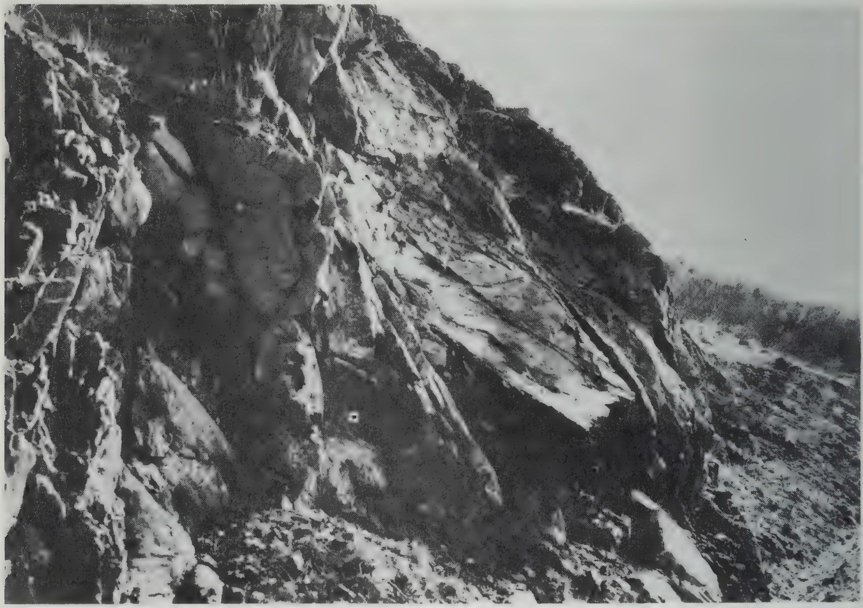

FIGURE 12. A typical slickensided serpentine outcrop on the Bagby Grade of Highway 49. Almost every piece of serpentine observed has a polished surface. *Photo by Mary H. Rice.*

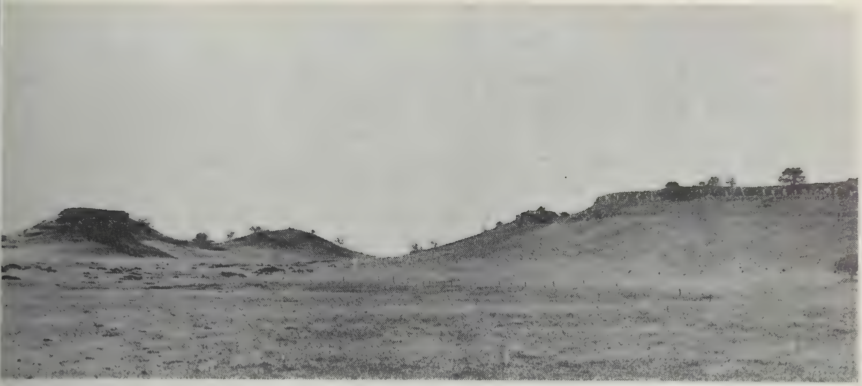

FIGURE 13. Low, flat topped buttes of sandstone resting on slate bedrock, Hornitos-Merced Falls road near the county line. The red and buff sandstones, which belong to the middle Eocene Ione formation, lie almost horizontally upon the upturned edges of the much older Jurassic slates. *Photo by Mary H. Rice.*

having slowly developed at the end of the Cretaceous period as elevations were reduced. Middle Eocene deposits are, therefore, of the sort produced by chemical weathering—quartz-andalusite-anauxite sands, kaolinite-type clays and the like. These are very sparsely represented in Mariposa County.

Still more sparsely represented are remnants of the Mio-Pliocene period of volcanism, which literally overwhelmed the Sierran province with volcanic debris. In Miocene time the range was again raised by warping and faulting, and numerous volcanoes broke out along the crest. These erupted rhyolitic ash first and then enormous volumes of andesitic fragmental material and flow-rock. Old stream systems were obliterated under piles of volcanic debris and new systems had to evolve. Eocene gold-rich stream deposits were buried under the volcanic mantle and were thus protected from later erosion—to survive to the present day. Volcanism continued intermittently into the Pleistocene with extrusion of flows of basaltic aspect and latitic composition.

Late in the Pliocene great faults developed east of the former crest of the range and highlands bordering the present Sierra began to drop down, probably accompanied by some re-elevation of the range-crest by tilting and by rise of fault blocks (Hudson, F. S., 1955, pp. 835-869). This faulting continued through the Quaternary along the east side of the Sierra Nevada and is going on today.

The tropical climate of Eocene time had gradually cooled to a temperate one by Mio-Pliocene time. This cooler trend climaxed in the Pleistocene with development of the alpine type of valley glaciers. These sculptured the High Sierra into the form we see it today. Throughout the Pliocene and Pleistocene epochs, great river systems carved the deep, V-shaped canyons so characteristic of the western three-fourths of the Mariposa County landscape. Although erosion has largely eaten away such early gold-placer deposits as once may have existed in the county, active erosion and temporary stream deposition are responsible for accumulation of the placer deposits so important to the early life of the county. Exhumed remnants of early Tertiary land surfaces yield most of the arable land and gently rolling pasture land in the county.

MINES AND MINERAL DEPOSITS

Statistical Summary

The recorded value of minerals produced in Mariposa County from 1880 through 1954 has amounted to $33,516,967. Gold production has amounted to approximately 71 percent of this total—$23,837,047, exclusive of 1951. Inasmuch as the estimated total gold production to date has been about $48,000,000 (Bradley, 1954, p. 32), it follows that approximately $24,000,000 in gold was produced prior to 1880. The estimated total mineral production, therefore, is more than $57,548,000, gold accounting for 83 percent of the estimated total.

The table on pages 40-42 lists the mineral production of the county by year and commodity from 1880 through 1954. Items listed under unapportioned include those wherein producers numbered less than three. In addition to the commodities listed in the table, 398,613 tons of barite valued at $2,760,493 was produced in the county between 1910 and 1948 and 2,430,842.5 captive tons of limestone was quarried in the period 1927 to 1945. The value of the limestone and barite is included in the unapportioned list.

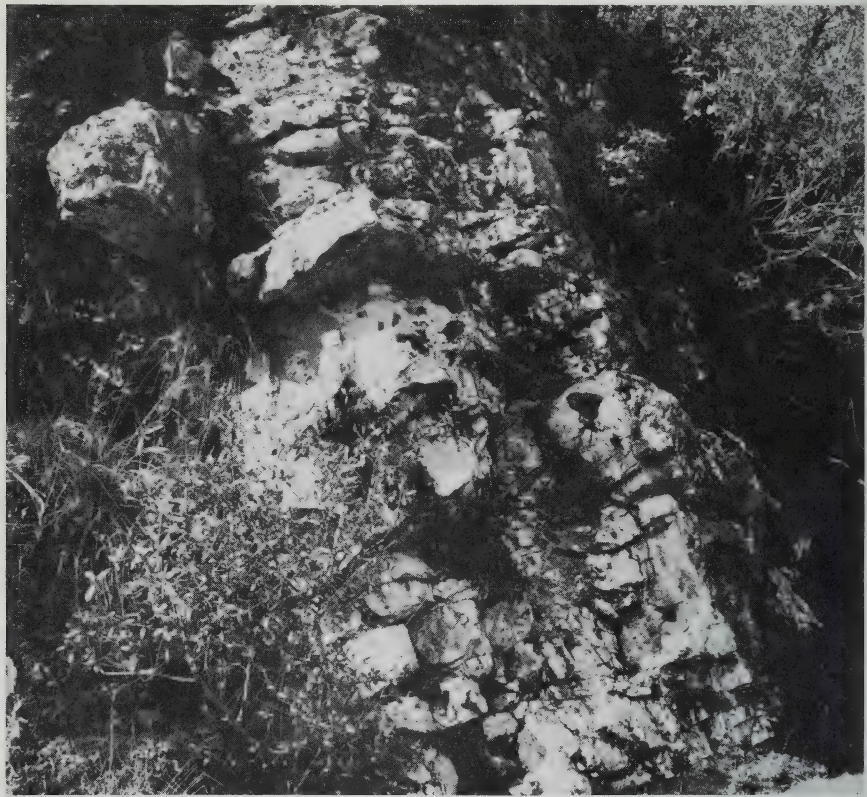

FIGURE 14. A typical exposure of Mother Lode quartz as seen along the west side of Highway 49 just south of Coulterville. The vein, which strikes away from the observer and dips steeply toward the right (northeast), is part of a multiple vein system which locally reaches widths of several hundred feet. The edge of the quartz sheet shown here is 15 to 20 feet thick. *Photo by Mary H. Rice.*

Table 2A. Summary of economic deposits of metallic minerals, Mariposa County.

Ore or source material	Origin and mode of occurrence	Time of formation	Associated rocks	Associated minerals	Utilization
Chromium	Magmatic segregations in serpentinized peridotite.	Upper Jurassic—prior to intrusion of the granitic rocks.	Serpentine, gabbro, pyroxenite, peridotite, dunite.	Chromite, antigorite, chrysotile, olivine, pyroxene.	Mainly in wartime as a source of chromium for ferro-alloys and refractories.
Copper	Mesothermal veins. Replacement and cavity fillings in shear zones.	Upper Jurassic—related to the intrusion of granitic rocks.	Quartz-rich vein matter, sheared, hydrothermally altered igneous and metamorphic rocks.	Oxidized zone—azurite, malachite, chalcocite, limonite. Below oxidized zone—chalcopyrite, bornite, pyrite, galena, sphalerite.	Mainly in wartime as a source of copper and copper chemicals.
Gold (lode)	Mesothermal veins and wallrock replacements adjacent to veins.	Upper Jurassic—related to intrusion of granitic rocks.	Quartz and quartz-ankerite-mariposite vein matter; albitite, granitic and greenstone dikes cutting numerous types of igneous and metamorphic rocks.	Native gold-silver alloys, pyrite, galena, arsenopyrite, sphalerite, chalcopyrite, tetrahedrite, quartz, ankerite, calcite, mariposite in numerous combinations.	Gold ore commonly yields silver, copper, and lead as well as gold.
Gold (placer)	River gravels. Soil mantle.	Eocene channels (rare). Pleistocene benches. Recent channels and benches.	Quartz-rich sand, gravel boulders. Soil mantle.	Native gold-silver alloys, ilmenite, chromite, magnetite, platinum, garnet, zircon, quartz, rock fragments.	California placer gravels commonly yield gold, silver, platinum and zircon (for refractories).
Lead	Mesothermal veins. Replacements and cavity fillings along shear zones.	Upper Jurassic—related to the intrusion of granitic rocks.	Quartz, quartz-carbonate, quartz-barite vein matter; sheared, hydrothermally altered metamorphic and igneous rocks.	Galena, sphalerite, pyrite, chalcopyrite, native gold, quartz, ankerite, calcite, limonite, in numerous combinations.	In addition to lead, zinc, copper, gold and silver are commonly recovered from lead ore.
Manganese	Marine sediment, probably of volcanic origin.	Paleozoic and Upper Jurassic.	Chert and jasper, greenstone.	Black manganese oxides, rhodonite, rhodochrosite, spessartite, chalcedony and jasperoid chalcedony.	Principally wartime—for steel alloys and as a deoxidizer in steel manufacturing.
Nickel	Mesothermal veins.	Upper Jurassic.	Quartz-mariposite-ankerite vein matter.	Niccolite, millerite, pyrite, ankerite, mariposite, quartz gold.	Not recovered thus far in Mariposa County. Used in alloys and as protective coating on other metals.
	Weathering of serpentine.	Early Tertiary to Recent.	Weathered serpentine, clay, chalcedony and opal.	Garnierite, serpentine minerals, clay, chalcedony opal.	

Table 2A. Summary of economic deposits of metallic minerals, Mariposa County—continued.

Ore or source material	Origin and mode of occurrence	Time of formation	Associated rocks	Associated minerals	Utilization
Platinum	Probably magmatic segregations disseminated in serpentinized peridotite. Erosion of serpentines.	Upper Jurassic—prior to intrusion of granitic rocks. Placers—Eocene to Recent.	Alluvial gravels.	Native gold-silver alloys, platinum, magnetite, ilmenite, chromite, garnet, zircon.	Recovered in small amounts occasionally as a minor constituent in placer concentrates. Used for jewelry and chemical utensils.
Silver	Mesothermal veins.	Upper Jurassic—related to intrusion of granitic rocks.	Quartz, quartz carbonate vein matter cutting many metamorphic and igneous rocks.	Native gold-silver alloys, pyrite, chalcopyrite, proustite, pyragyrite, etc.	Ores commonly yield gold, copper, and lead in addition to silver. In rare cases zinc is also saved.
	Gold placers.	River gravels—Eocene to Recent.	Alluvial gravels.	Same as for gold and platinum.	See gold.
Tungsten	Contact metamorphism of ancient marine sediments. Mesothermal veins.	Upper Jurassic—related to the intrusion of granitic rocks.	Limestone, tactite, limy slate.	Scheelite, calcite, garnet, epidote, quartz. Occasionally wolframite.	Machine-tool alloys, electric light filaments. Predominantly wartime.
Zinc	Replacements and cavity fillings along shear zones. Mesothermal veins.	Upper Jurassic—related to intrusion of granitic rocks.	Sheared, hydrothermally altered metamorphic and igneous rocks. Quartz-rich vein matter.	Sphalerite, galena, pyrite, chalcopyrite, quartz, barite, limonite.	Coverings for ferrous alloys and constituent of nonferrous alloys, pigments, chemicals.

Table 2B. Summary of economic deposits of nonmetallic minerals, Mariposa County

Ore or source material	Origin and mode of occurrence	Time of formation	Associated rocks	Associated minerals	Utilization
Andalusite	Contact metamorphism of shale.	Upper Jurassic.	Slate near contacts with granitic rocks.	Sericite, graphite.	Not utilized thus far in Mariposa County. Porcelains and refractories.
Asbestos	Deuteric (?) alteration of peridotite.	Upper Jurassic—prior to intrusion of granitic rocks.	Serpentine rock.	Antigorite, bastite.	Insulation.

Barite	Hydrothermal replacement of limestone and related crystalline rocks.	Upper Jurassic (?).	Limestone, quartzite, slate, schist, zinc ores.	Barite, witherite, quartz, lead-zinc-copper ore minerals.	Weighting of oil-well drilling mud. Barium chemicals and pigments.
Clay	Weathering of a wide variety of rocks; alluvial concentration and sorting.	Eocene to Recent.	Quartz sand and white clay. Alluvium and mantle with dark clays.	Various clay minerals and detritus.	Brick, tile, other ceramic articles.
Limestone	Marine sediment.	Paleozoic and Upper Jurassic.	Limestone, slate, greenstone.		Portland cement, lime.
Magnesite	Hydrothermal veinlets.	Upper Jurassic, probably prior to intrusion of granitic rocks.	Serpentine rock.	Serpentine-family minerals.	Not utilized in Mariposa County thus far. Magnesia refractories, oxychloride cement.
Mica schist	Metamorphism of rhyolite tuff.	Upper Jurassic.	Slate, quartzite, meta-sandstone.		Lubricant in rubber goods. Mineral filler.
Roofing granules and terrazzo chips	Numerous igneous and metamorphic rocks—serpentine, slate, etc.	Paleozoic to Upper Jurassic.			Protective covering on asphalt-base roofs. Aggregate in polished concrete floors and walls.
Sand and gravel	Alluvial deposits.	Tertiary to Recent.	Alluvial debris.		Road metal, railroad ballast, road base, concrete aggregate, plaster sand.
	Mine dumps. Mill tailings.				
Silica	Vein quartz.	Upper Jurassic.			Manufacture of ferro-silicon, chemicals.
Stone miscellaneous					
Greenstone	Submarine volcanism.	Paleozoic, Upper Jurassic.			Building stone, road base.
Granite	Igneous intrusion.	Upper Jurassic.			Building stone, aggregate.
Chert	Marine volcanic sediment.	Paleozoic and Upper Jurassic.			Road base, railroad ballast.
Soapstone	Hydrothermal alteration of serpentine.	Upper Jurassic.			Building stone, insecticides.
Slate	Contact metamorphism of shale.	Upper Jurassic.			Roofing slabs, granules.

Table 3. Mariposa County Mines having an estimated production greater than $100,000 up to 1954.

Name of mine	Value of products	Type of mine
1. Princeton	$5,000,000	Gold
2. Pine Tree and Josephine	4,000,000	Gold
3. Mount Gaines	3,590,000	Gold
4. Clearinghouse	3,350,000	Gold
5. Hite	3,000,000	Gold
6. Hasloe	3,000,000	Gold
7. Jenkins Hill	3,000,000	Limestone
8. El Portal Barite	2,760,493	Barite
9. Mariposa	2,395,405	Gold
10. Washington	2,377,000	Gold
11. Blue Moon	2,054,000	Zinc-lead-copper
12. Bandarita	1,520,000	Gold
13. Mary Harrison group	1,500,000	Gold
14. Red Cloud	1,500,000	Gold
15. Malvina group	1,000,000	Gold
16. Mountain King	1,000,000	Gold
17. Virginia	824,000	Gold
18. Diltz	750,000	Gold
19. Ruth Pierce	600,000	Gold
20. Whitlock group	500,000	Gold
21. Oakes and Reese	500,000	Gold
22. Spread Eagle group	425,000	Gold
23. Quail	400,000	Gold
24. Bondurant	390,000	Gold
25. Sierra Rica	300,000	Gold
26. Mt. Ophir	250,000	Gold
27. White Rock Silica	200,000	Silica
28. Pyramid	200,000	Gold
29. Marble Springs	200,000	Gold
30. Feliciana	159,500	Gold
31. Schroeder	158,400	Gold
32. Golden Key group	154,000	Gold
33. Champion I	150,000	Gold
34. Greens Gulch	119,140	Gold
35. French	116,750	Gold
36. Pocohontas	113,800	Copper
37. Tyro	110,000	Gold
38. Long Mary	108,928	Gold
39. Red Bank	100,000	Gold
40. Doss	100,000	Gold

The principal deposits for which the authors were able to collect considerable data are listed alphabetically by commodity and property name. Such data as were available for the other mines and prospects of the county will be found in the tabulation which follows the text. All mines known to the authors are covered in the tabulation.

METALLIC MINERALS

Chromium

Chromium most commonly occurs in the mineral chromite ($FeCr_2O_4$), and in California is found in economic accumulations only in peridotite or its alteration products. Chromite may occur as a massive segregation in peridotite or it may be disseminated in grains or pebble-shaped clots in a matrix of magnesian silicate minerals. Ore is generally classed as massive, disseminated or leopard, leopard ore being clots of chromite in a serpentine matrix. All of the known occurrences in Mariposa County are of massive type, but masses of ore seldom exceed a hundred tons. According to Cater (1948, p. 8), large concentrations of chromite are found only in dunite, a variety of peridotite made up chiefly of olivine. Most of the peridotite in Mariposa County is the variety saxonite, containing abundant enstatite as well as olivine. Serpentinization is well advanced in all of the Mariposa County peridotite masses.

The two main masses of serpentine, elongated in a northwesterly direction to the Mother Lode, stretch almost continuously from Mt. Bullion north through Coulterville and across the northern county boundary. A maximum thickness of about 2 miles is attained by the more southerly of the two main masses just north of Bagby. A narrow, northwest-trending belt of serpentine is also present adjacent to the north bank of the Merced River a few miles northwest of Bagby.

Chromite has been mined on three properties in Mariposa County, all active during World War I. The following excerpts are from Cater (1948, pp. 14-15) who abstracted the material from unpublished wartime reports by N. L. Taliaferro.

Fossow Property (1). "The deposits on the Fossow property are in the NE¼, sec. 29, T.2S., R.16E., immediately at the crossroads known as Peñon Blanco, about 3 miles by road northwest of Coulterville. The only ore found occurred as float plowed out of the deep soil covering a small flat near the crossroads, and was on the west side of a small draw near the west contact of a highly sheared serpentine mass. At the time of Taliaferro's visit in 1918, about 600 pounds of such ore had been recovered, but none was ever shipped." (The property apparently is now part of patented claims owned by Oro Rico Mines Co., c/o A. D. Vencile, Room 14, 1584 Washington Boulevard, Los Angeles).

Reed Property (2). "The deposit on the Reed property is on Blacks Creek, 1 mile southeast of the Fossow deposits in SW¼, sec. 27, T.2S., R.16W. Workings consist of a few trenches and a small open cut about 4 feet deep. The ore occurred as very small lenses striking N.40° W., parallel to the schistosity of highly sheared serpentine country rock. This deposit, like the Fossow deposit, is near the west contact of serpentine with Mariposa slates. At the time of Taliaferro's visit in 1918, about 600 pounds of medium-grade chromite had been mined and a small amount of ore was in sight in the cut." The property now is part of the holdings of Walter J. Lautenschlager, 626 So. Catalina Street, Los Angeles 5, California.

Riverside Chrome Mine (Purcell-Griffin) (3). "The Riverside chrome mine is about 3½ miles south of Coulterville in the NE¼, sec. 22, T. 3 S., R. 16 E. The deposit was located and worked by T. C. Purcell who shipped 32 long tons of ore from it in 1918. Workings consist of an east-trending open-cut 15 feet long and 8 feet deep, at the end of which is a pit 4 feet by 6 feet [in plan] and 10 feet deep. The ore consisted of an irregular lens of chromite striking about N. 80° W., near the north end of a narrow serpentine mass. Near the workings the serpentine is soft and highly sheared, but a short distance west of the pit it is more compact and contains fine streaks and disseminated grains of chromite. The schistosity of the serpentine in the vicinity of the workings strikes N. 25°–30° W., at an angle to the attitude of the ore body. No ore remained in sight in the workings at the time of Taliaferro's visit, and it is assumed the deposit was exhausted." The property is on or adjacent to the Adelaide gold mine, a patented property owned by Alfred W. Stickney, 435 Hillcrest Road, San Mateo, California.

Copper

Mining of copper in Mariposa County is confined at present to small-scale, intermittent activity with occasional small shipments of oxidized ore. Some shipments of gold ore contain recoverable copper and there is a small supplementary production from this source. The recorded production of copper since 1880 is about 2,205,000 pounds valued at $344,500. Although there was some unrecorded production in the 1860s the total copper mined in the county prior to 1880 was probably small. As the total production of copper in California has amounted to about 600,000 tons (O'Brien and Crosby, 1950, p. 308) the amount of that total contributed by Mariposa County has been less than 1 percent.

The primary copper deposits in Mariposa County are all of mesothermal origin and may be divided roughly into three classes: those where copper is a by-product of gold mining, those where copper, zinc and lead minerals are associated, and those in which copper ore-minerals predominate. However, most copper ores contain some gold and silver and many gold ores contain some copper so that the classes are gradational. Copper ore is generally concentrated in shoots in shear zones which cut a wide variety of wall rocks. Quartz or quartz and barite and pulverized wall rocks are the common gangue materials. The principal copper mines occur in northwest-trending belts that roughly parallel the Mother Lode vein system. Although the copper deposits are probably not directly related to the more extensive gold-quartz veins—some can be demonstrated to have formed earlier than some of the gold deposits—the structures which allowed egress to the mineralizing solutions of both gold and copper formed during the same orogenic period, and both metals are believed to have stemmed from solutions given off during late-stage cooling of the intrusive granitic rocks. The various theories of origin of the copper in the Sierran foothills are covered by Heyl (1948, pp. 25-28).

Most of the copper and zinc-copper mines are concentrated in three narrow belts, each trending roughly N. 35° W. The most southerly begins in the vicinity of Green Mountain School and extends somewhat northwest of White Rock ranger station. Principal mines in this group are the Green Mountain group, Lone Tree, Cavan-San Jose Great Northern and Pocahontas. A second belt, chiefly zinc-copper-lead mines, extends from somewhat northeast of Hornitos to Exchequer Dam. The Blue Moon and American Eagle mines are the principal examples of this group. A third belt of copper mines is in Hunter Valley between Cotton Creek and Jasper Point on the Merced River. The La Victoria and Barrett mines are the principal copper mines in this district. The Blue Moon and Pocahontas mines are by far the largest copper producers in the county but the Blue Moon mine is primarily a zinc mine. Gold mines which have produced notable amounts of copper are the Mount Gaines, Washington and Pine Tree and Josephine.

Barrett (Baretta, Barette, Beaudry) Mine. Location: Secs. 29, 30, 32, T. 3 S., R. 16 E., M.D., in hill land at the northern end of Hunter Valley. Accessible from the paved Bear Valley-Hornitos road by 3½ miles of paved road and 4½ miles of graded dirt road. Ownership: Angelo Beaudry and Inez Bouvier, 1431 Moraga Street, San Francisco, California, own three patented claims, the Wildcat, Mountaineer, and

New Year, and a rectangular piece of land known as Berettas Enclosure which includes most of the old Barrett and Beaudry claims.

The Barrett mine is a very old property discovered during the 1860s (Aubury, 1905, p. 215). It was owned in 1902 by Joseph Baretta (ibid.) and at that time had a shaft 200 feet deep. More than $90,000 had been realized from the mine up to 1907 (Lang, 1907, p. 966) most of this amount having come from a pocket of coarse gold. In 1920 the property was under lease to C. H. Burt of Mountain View (Castello, 1920, p. 102) and by that date a tunnel had been driven northeast to intersect the northwest-trending ore zone. For a short period during 1931-32 it was mined by D. Jacobs of Coulterville and produced 100 tons of high-grade gold ore from which 70.7 oz. of gold and 16 oz. of silver were recovered (U. S. Bureau of Mines records). In recent years the mine has been idle and there is no equipment on the property.

The Barrett mine is among a large group of mines and prospects that include the Castagnetto, Bruschi, Ferrari, Oaks and Reese and Iron Duke mines. Many of these mines and prospects contain both gold and copper, probably as the result of separate mineralization. The Barrett has produced pocket gold ore and gold ore of milling grade as well as high-grade, oxidized and sulfide copper ores. Upper parts of the present, partly caved workings, apparently on the Wildcat claim, expose a copper-stained quartz vein 1 to 2 feet wide, striking N. 60° to 65° E. and dipping 65° southeast. Lang (1907, p. 966) describes banded vein matter composed of alternating bands of calcite or calcite and barite and quartz. Pyrite and chalcopyrite more or less impregnate the vein matter in unoxidized parts of the veins. Some massive sulfide ore showing some malachite was on the dumps on the Wildcat claim in September 1954. Lang (1907, p. 966) mentions vein structures trending N. 15° W. and there are probably two sets of mineralized structures. Soil cover is heavy and the area is brushy. Wall rocks are chiefly meta-augite andesite greenstone although chert has been described in the workings. No chert was present on the dump. The greenstone is part of the Peñon Blanco member of the Upper Jurassic Amador group of rocks (Taliaferro, 1943, pp. 282-284). Rhythmically banded chert and associated sedimentary rocks of the Hunter Valley chert member of the Amador group, exposed along the road south of the Barrett mine, strike N. 40° W. and dip 63° northeast and it is assumed the enclosing greenstones in general follow a similar trend in this area.

Blue Moon (Blue Cloud, Red Cloud, Porcupine) Mine. Location: Secs. 19, 30, T. 4 S., R. 16 E., M.D., 6 miles north of Hornitos. Ownership: Not determined. Last operator was Hecla Mining Company, Wallace, Idaho (1945).

The Blue Moon mine is primarily a zinc mine but produced a notable amount of copper. 55,656 tons of ore milled in 1944-45 yielded 406,038 pounds of copper, 13,687,920 pounds of zinc, 553,753 pounds of lead, 3,446 ounces of gold and 208,965 ounces of silver (Eric and Cox, 1948, p. 145). The mine is more fully discussed under zinc.

Good View (Cavan, Cavan-San Jose). Location: 3 miles west of Green Mountain School in secs. 5, 8, 9, T. 8 S., R. 18 E., and sec. 32, T. 7 S., R. 18 E., M.D. Ownership: Mine-Metal Properties, Inc., c/o C. C. Kellogg, 50 Twenty-sixth Street, Merced, California, owns 161.3

acres of patented land including the following claims: Copper King, Crown Point, Good View, Little Giant, Rothschild, San Jose, Stonewall Jackson and Sunset. Accessible from Green Mountain School by 2½ miles of graded dirt road and 1¼ miles of truck trail.

The Good View mine is an old property discovered in the early 1860s (Lowell, 1916, p. 573). Little is known of its history until the period of operation by Cavan Mining and Milling Company of Stockton from about 1900 to 1910. It was then known as the Cavan Copper Mine. According to old U. S. Bureau of Mines records, 22 tons of ore was shipped from the Good View claim in 1902 which yielded 8,673 pounds of copper, 8 ounces of silver and .87 ounces of gold. In 1907, 45 tons of ore yielded 4,624 pounds of copper and 1.21 ounces of gold. By 1913 the property had passed into the hands of S. L. Pearce who shipped 7 carloads of ore to the Selby, California, smelter which averaged $1000 per car (Lowell, 1916, p. 573), the ore carrying $2.50 in gold per ton (at the price of gold then). By 1927 the mine had passed to the ownership of Samuel L. Thrift, et al., of Stockton and patent had been acquired by the property (Laizure, 1928, p. 125). Since then the mine has been known as the Good View. The property has been idle for a considerable period and all equipment had been removed (1954).

Workings are driven chiefly in black slate, mica-andalusite schist and blue-black quartz-biotite hornfels, all derived from clay shale, and schistose metadiorite (?) intrusive into the metasediments. Some thin, lenticular beds of metavolcanic material, probably tuff, are interbedded with the metasediments in minor amounts and some metasandstone is included in the slate. The metamorphic sequence is part of the Mariposa formation of Upper Jurassic age. Regional trend of the folds in the metasediments is northwest and the fracture systems along which ore has developed also trend northwest.

As most of the workings have no means of access or are watered, and as individual workings and claim boundaries are difficult to identify, the workings can only be described in a general way. In 1902 a tunnel, then 240 feet long, was being driven to intersect the parallel Rothschild and Good View veins. This tunnel was estimated to strike the Good View vein at a depth of 375 to 400 feet and the Good View at 250 feet (Aubury, 1905, pp. 207-208). A 20-foot shaft at the south end of Good View vein is also mentioned which followed a 6-8 inch streak of ore running 15-25 percent copper. This streak was traceable on the surface for 1400 feet. The main shaft, apparently on the Good View claim, was described as 140 feet deep, exposing a vein 6 inches to 6 feet wide. Ore was described as oxidized to a depth of 75 feet with massive sulfides below 75 feet. (Azurite, malachite and chalcopyrite are the chief ore minerals in the district.) Aubury (1905, p. 208) also mentions a 58-foot shaft on the Sunset claim, exposing ore containing 17 percent copper from 10 feet below the surface to the bottom of the shaft in widths of 6 to 30 inches; a 20-foot and a 60-foot shaft and a 65-foot crosscut tunnel on the Copper King claim (no drifts); and a cross-cut tunnel 170 feet long on the San Jose claim from which three winzes 40, 80, and 115 feet deep had been sunk. The San Jose workings developed an ore body 65 feet long and 4 to 4½ feet wide and at least 115 feet deep. Surface work only had been done on the Crown Point, Stonewall Jackson, and Little Giant claims.

Green Mountain (Copper Mountain, Legioneer, Copper Queen) Group. Location: Secs. 3, 10, T. 8 S., R. 18 E., M.D., 2 miles northwest of Green Mountain School. Ownership: Dr. Felix A. Smith, 507 Medical Building, Oakland 12, California, owns 11 unpatented claims, the Amador, Copper Chief, Copper King, Copper Mountain, Copper Peak, Discovery, Francisco (Frisco), Green Mountain, Juliet, and Last Chance. The Copper Queen and Buena Vista patented claims are owned by Marie D. Kellogg, et al. (½), 50 Twenty-sixth Street, Merced, California, and Dr. Felix A. Smith (½).

Croppings of copper ore were found in the Green Mountain area in 1861 (Lowell, 1916, p. 572) and the claims were worked intermittently between 1863 and 1900. From the early 1900s to 1923 the property was owned and intermittently worked by the Legioneer Gold Mining Company, O. R. Sydney, et al., of LeGrand or their authorized lessees. The Legioneer company also worked the Lone Tree mine in the early 1900s. During 1903, 170 tons of ore was shipped which yielded 14,245 pounds of copper. In 1904, twenty tons of ore were shipped from which 9,500 pounds of copper was extracted (U. S. Bureau of Mines records). These figures are believed to be representative of the amount and type of ore shipped at various times during the early 1900s but are not the only shipments made. In 1919 the United Chemicals Company of San Francisco completed construction of a leaching and precipitation plant at Raymond, Madera County, to process ore from the Green Mountain mines. Copper oxide, copper sulfate and iron sulfate were produced in this plant, the average ore treated running 6 percent copper (Castello, 1921, p. 103). The Legioneer company continued to operate the mine while the Raymond plant was in operation, O. R. Sydney acting as superintendent. From 1923 to about 1929 the properties were operated by the Floraferro Company of San Francisco. This company sold pulverized, oxidized ore as a soil additive and insecticide. The Copper Producers Trust of Boston, Massachusetts, held title to the properties for a while in the late 1920s.

Ore bodies occur as replacements in schist along irregular-shaped shear zones, a majority being oriented roughly northeast with steep dips toward the southwest. The schist is cut by dikes and irregular intrusions of granitic rocks. Ore in the upper or oxidized parts of the shoots contains various combinations of the minerals, malachite, azurite, chalcocite, cuprite and native copper. Primary ores in the lower parts of the shoots are made up chiefly of chalcopyrite and pyrrhotite. Veins and irregular replacements adjacent to veins occur over a width of as much as 1200 feet and some masses of sulfide ore reach a width of 60 feet (Aubury, 1902, p. 253). Much of the ore proved difficult to handle because it crumbles and heats upon exposure to air (Aubury, 1905, p. 254).

There are more than 4,000 feet of underground workings on the property (Castello, 1921, p. 103) including numerous openings to the surface. Aubury (1905, p. 204) states ". . . the most important (openings) are two tunnels several hundred feet in length, above which are the stopes and chambers from which the best ore has been taken. The lower or east tunnel is in 600 feet (1902). At about 400 feet it has crosscut a vein 60 feet in width. . . . The main body of ore lies back of this, the openings or workings of which are about 60 feet above the tunnel level, to which they are all connected with an upraise. . . . About 900 feet west from the above tunnel and 50 feet above it, another tunnel has been run several hundred feet, and from it a large quantity of carbonate and sulfide ore has been extracted . . .''.

Johnnie Green (Green, Johnny Green, Johnny Green Jr.) Mine. Location: NE¼, sec. 31, T. 7 S., R. 18 E., M.D., accessible by 4½ miles of truck trail from the graded LeGrand-White Rock (Ganns Creek) road or by 3½ miles of truck trail from the graded Green Mountain School road. Ownership: undetermined.

There is little record of the early history of this mine. In October 1866, fifty men were employed at the mine and about 50 tons of copper were smelted and shipped per week (Min. and Sci. Press, vol. 17, no. 17, p. 262, 1866). In 1907 high-grade copper ore was still being mined which was described as massive chalcopyrite replacing schist (Lang. 1907, p. 964).

The mine workings are in a belt of quartz-mica and quartz-mica-chiastolite schist, the schist being derived by contact metamorphism of clay shale of the Mariposa formation of Upper Jurassic age. The strike of the schist is N. 30°-40° W. and the dip is roughly 60° northeast. Primary ore consists of chalcopyrite and pyrite or pyrrhotite impregnating schist in replacement masses bordering narrow quartz veins. There is some carbonate ore in the upper parts of the shoots.

A shaft of undetermined depth inclined 60° northeast is the principal working but there is a second shaft opening 75 feet northeast of the main shaft, also inclined 50°-60° E., but partly caved and of unknown depth. North of these workings, several hundred yards, is a second group consisting of 2 inclined shafts and a caved tunnel driven about N. 20° W. The workings have no means of access and there was no equipment on the property in September 1954. A small shipment of oxidized ore was shipped from this area in 1954, but the authors were unable to determine which property the ore was from.

La Victoria (Victoire, La Victoire, Tandem) Mine. Location: Secs. 4, 9, 10, T. 4 S., R. 16 E., M.D., in Hunter Valley, 11 miles by graded road north of Hornitos. Ownership: Ralph E. and Libbie N. Dailey, 1165 West 22nd Street, Merced, California.

The La Victoria Copper Mine was thoroughly investigated by Manning W. Cox and Donald G. Wyant of the U. S. Geological Survey as part of the wartime research on the copper-zinc belt of the Sierran foothills. The results of this investigation were published in 1948 by the California Division of Mines on pages 127-132 of Bulletin 144, entitled ''Copper in California.'' The following discussion is largely abstracted from this source.

The La Victoria deposits were discovered in April 1864 and explored by the La Victoria Mining Company. This company and its successors mined and sorted high-grade ore for direct shipment to smelters and also constructed a small furnace on the property to treat low-grade ore. By 1873, most of the readily accessible ore had been removed and the mine was shut down. Some ore was shipped during the 1890's and in 1917. From May 1943 to March 1944 the mine was under lease from the owner, Herbert Lang, by R. B. Lamb. During this period the mine workings were partly rehabilitated and the property was sampled with the aid of a R.F.C. loan. Since that time the mine has been inactive.

Mine workings are driven in meta-augite andesite greenstone which has prominent pillow structure. The pillows range in diameter from a few inches to 4 feet. Many are surrounded by a thin shell of mudstone or by masses of epidote and in some places the greenstone pillows occur in a matrix of brecciated greenstone and red jasper. These metavolcanic rocks are part of the Upper Jurassic Amador group and the mine workings are near the crest of a large northwest-trending anticline (Taliaferro, 1943, p. 125).

The La Victoria ore zone, exposed for 125 feet along the main level, is found along the main shear zone of a system which strikes N. 50° W. and dips 10°-45° northeast. A second mineralized shear zone near the Cavagnaro shaft trends N. 45° W. and dips 30°-60° northeast. The two mineralized zones are truncated by the Poupion shear zone which strikes N. 60°-80° W. and dips 65°-87° north. This zone is not mineralized. In the La Victoria ore zone the copper-bearing part of the shoot is restricted to the part of the shear zone that strikes N. 15° W. The more west-trending part of the zone is principally quartz-pyrite rock with very little copper. Ore occurs in pods a few inches to 15 feet long and from 1 to 3.2 feet wide, although masses of oxidized ore removed during the early history of the mine may have been larger. Primary ore consists of fine-grained chalcopyrite, pyrite and quartz. Secondary minerals are chiefly azurite, malachite and chalcocite. Browne (1868, p. 213) mentions a considerable quantity of black oxide in ore mined in the 1860's. The average copper content of pillar samples in the upper workings of the mine is 5.3 percent and 4.1 percent on the bottom level. The ore was partly oxidized for the full depth mined and completely oxidized for a depth of 30 feet below the outcrop of the mineralized zone. Copper had been almost completely leached from the uppermost 20 feet of vein matter.

According to Cox and Wyant (1948, p. 131) the enriched 5 percent ore of the mine is nearly exhausted, but a small amount remains in pillars above the bottom level. A 2-foot-wide ore shoot in the north-trending part of the La Victoria ore zone continues below the present mine workings and may have a strike length of 110 feet. The average grade of primary ore on the bottom level, which runs 4 percent copper, 2 percent zinc and less than 0.1 ounce of gold per ton, may represent the grade of ore to be expected below. The only other zone believed to carry copper ore is the one just east of the Cavagnaro shaft.

Pocahontas Mine. Location: NW ¼ sec. 12, T. 7 S., R. 17 E., M.D., one mile north of White Rock School by good dirt road. Ownership: Estate of Eben N. Briggs, c/o L. M. Olds, 57 Post Street, Room 402, San Francisco, California.

The Pocahontas mine has been the most productive copper mine in Mariposa County, having yielded more than 700,000 pounds of copper as well as considerable gold and silver. The gross amount realized from the mine has been well over $100,000. The Pocahontas deposits were discovered in the early 1860s but apparently were not extensively mined until the early 1900s. The property was owned in 1903 by J. E. Waller of LeGrand, and was under lease to C. and S. Wilcox of White Rock. These lessees mined and shipped over $30,000 worth of copper ore in a three-year period (Aubury, 1905, p. 210). The mine then passed into the ownership of Mrs. Abbie Waller and was under lease for a short time by William McIntosh and W. M. Darling of San Francisco. By June 1907 the mine had been taken over by the Pocahontas Copper Mining Company, was operated under the direction of J. B. Roberts for a short time, and then under direction of David Ross. By August 1907, the shaft had been sunk to a depth of 145 feet, plans had been made to sink 500 feet deeper and a smelter was planned (Eng. and Min. Jour., vol. 84, no. 12, p. 563, 1907). Late in September 1907 the property was leased to the Michigan Steamship Company of San Francisco (Eng. and Min. Jour., vol. 84, no. 19, p. 896, 1907) but this lease apparently was short lived. The Pocahontas Copper Mining Company or its lessees worked the mine during World War I. According to U. S. Bureau of Mines records, the Pocahontas mine produced 6,985 tons of ore from 1902 to 1913, inclusive, that yielded 621,273 pounds of copper, 383.92 ounces of gold, and 12,618 ounces of silver. A small amount of ore was shipped by lessees in 1914 and in 1916 1,200 tons of ore was shipped that yielded 63,220 pounds of copper. The mine has been idle since World War I but is still owned by heirs of officers in the Pocahontas Company.

The Pocahontas mine workings are driven in contact-altered rocks of the lower (?) member of the Upper Jurassic Mariposa group. These wall rocks consist principally of quartz-biotite and quartz-biotite-andalusite schist and quartz-biotite hornfels derived from tuffaceous sediments. Along the mineralized zone a sheet of hornblende-rich granitic rock has been intruded parallel to the schistosity and other thin sheets of biotite quartz diorite have penetrated the schists near the mine openings. A stock of biotite quartz diorite crops out less than 400 feet southeast of the main shaft. The hornblende-rich dike has been hydrothermally altered and mineralized and the original nature of the rock is, in many places, unrecognizable (Forstner, 1908, p. 748). Some hornblendite is on the dump but this rock does not crop out conspicuously because of masking limonite-quartz gossan.

The copper mineralization is concentrated in a shear zone which strikes N. 35°-45° W. and dips northeast at angles between 65° and 80°. The primary sulfide ore occurs in lenticular masses in a gangue of brecciated wall rock and introduced quartz. One of the sulfide ore shoots mined in the early 1900's was 50 feet long, 4 feet wide and more than 100 feet deep (Aubury, 1905, p. 210). Much of the primary ore is a dark bluish, massive, fine-grained rock composed predominantly of chalcopyrite, pyrite, sphalerite and pyrrhotite. According to Aubury (1905, p. 210) this type of ore ran 6 to 12 percent copper and $2.50 per ton in gold (at the 1902 price). The ore-bearing zone has been oxidized and secondarily enriched to a depth of about 100 feet but most of this ore along the main ore zone has been already mined. Much of this oxidized ore, consisting principally of malachite, chrysocolla and azurite, ran from 30 to 35 percent copper. Minable oxidized ore reached a width of 20 feet (Forstner, 1908, p. 747-748) in some shoots.

Workings (September 1954) consist of 7 shafts from 15 to 75 feet deep and a tunnel driven northwest, opening four or five hundred feet southeast of the main shaft. Most of the shafts are inclined steeply east and follow the ore zone. The main shaft is surmounted by a wooden

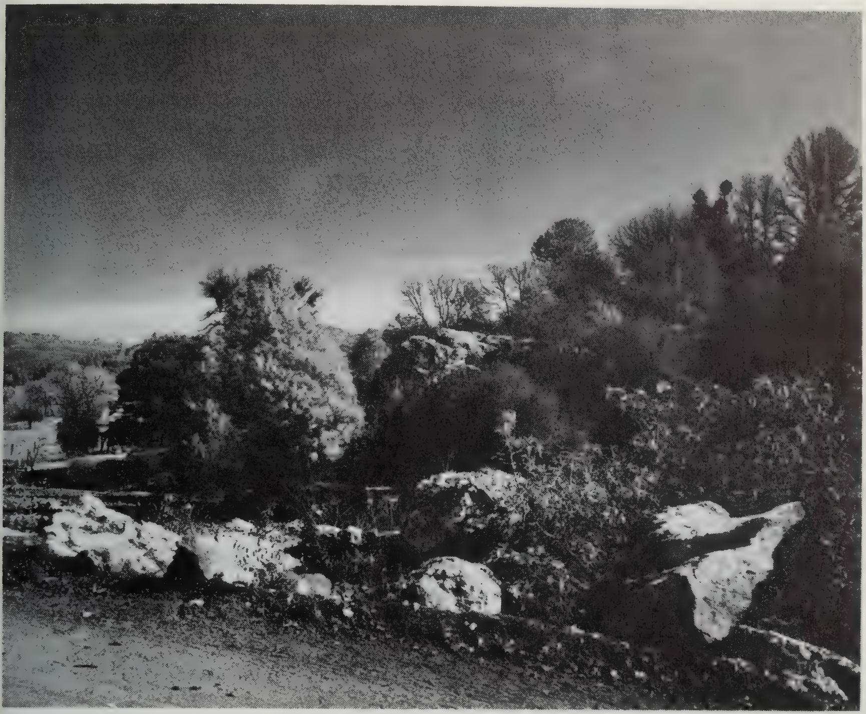

FIGURE 15. A typical Coulterville scene, observer facing southeast from the edge of Highway 49. To the right of the large quartz vein standing in the middle ground is the Louisa mine, one of several mines of the productive Mary Harrison group. *Photo by Mary H. Rice.*

headframe and ore bin, both in poor condition. According to Lowell (1916, p. 573) this shaft was 300 feet deep in 1913 and there was a total of 900 feet of drifts from the various shafts. Julihn and Horton (1940, p. 166) place the depth of the main shaft at only 200 feet. In 1954 the shaft was caved at a depth of 75 feet. The tunnel, described as 200 feet long in 1913 (Lowell, 1916, p. 573) is driven N. 33° W. on mineralized material. It is caved a few feet from the portal, and is inaccessible.

Estimation of reserves is not possible because the condition of the workings makes entry unfeasible. There are numerous gossan outcroppings which do not appear to have been explored and several shear zones parallel to the principal ore zone have not been thoroughly prospected. Showings of copper minerals may be seen over a width of more than 1000 feet. A number of small masses of high-grade copper ore were found south of the present workings at the contact of the metasedimentary series and coarse-grained quartz diorite (Forstner, 1908, pp. 747-748). None of the old accounts indicates that there is a lowering in the grade of the sulfide ore at depth.

Gold

Although gold mining currently is at a low ebb because of high operating costs in relation to the average grade of ore obtainable at

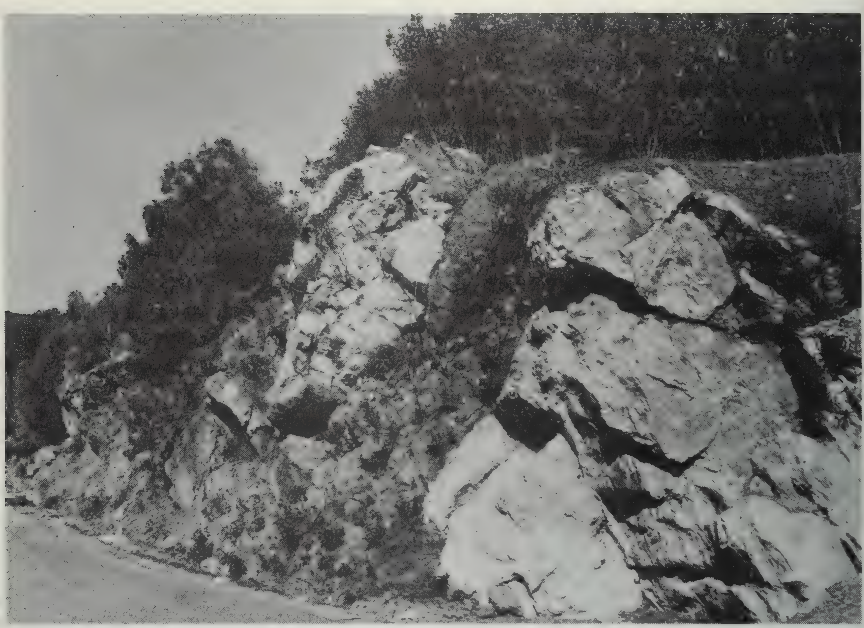

FIGURE 16. An outcrop of green mariposite-ankerite-quartz vein rock exposed along Highway 49 between Mary Harrison mine and Coulterville. This pretty, durable rock is finding its way into many California gardens as an ornamental stone. It is quarried for this purpose farther south along Highway 49. Large, lenticular masses of the rock are found in the Mother Lode vein system alternating with sheets of milky quartz. *Photo by Mary H. Rice.*

most mines, gold mining has always been vital to the economy of Mariposa County. The total gold production of Mariposa County through 1954, which amounts to about $48,000,000, is only part of the wealth brought into the county through businesses connected directly or indirectly with mining. A variety of factors, particularly a rise in the price of gold, could quickly change the economic structure of gold mining and result in rejuvenation of the gold mining industry. A majority of the mines has not been exhausted of ore and their reactivation awaits some significant change in the economics of precious metal mining.

Placer-gold was discovered in Mariposa County about 1848, although precise details are lacking. Among the earliest placer miners were Mexicans or Californians of Spanish descent. Much of the geographic nomenclature still in use in western Mariposa County is drawn from the Spanish place names such as Mariposa (butterfly), Agua Fria (cold water) and Hornitos (little ovens). Discovery of lode-gold is commonly credited to Kit Carson and two associates at the Mariposa mine in 1849, but again the more secretive Mexicans may already have been working their arrastras in the Hornitos district. John C. Fremont's Las Mariposas Spanish land grant was interpreted as including the southern end of the soon-to-be-famous Mother Lode, and after lengthy litigation a very large area was set aside for private administration and not developed in the same fashion as claims located on public lands. As the Las Mariposas Grant mines were not located and surveyed according to early public land survey practice, land plats within the grant to this day are difficult to locate with respect to survey lines outside of the grant.

In addition to Las Mariposas grant, a large block of land north of the Merced River was held under single management by the Cook Estate and these two great properties greatly affected the course of gold mining in Mariposa County. Under these large enterprises there were notable periods of efficient and profitable management of the mines. At other times the mines suffered from mismanagement and lack of incentive toward vigorous development. It is a moot question whether the mines of the two properties as a whole would have proven more productive in the course of normal development under public land regulations than they have under the collective management of the two large interests.

As in other Sierran foothill counties, the lode-gold mines of Mariposa County have been conveniently grouped, for the sake of discussion, into the Mother Lode, East Belt and West Belt groups. The Mother Lode is a system of mesothermal quartz veins occupying a major thrust-fault zone. It is not a single great, continuous vein but rather is a series of discontinuous veins which in places are parallel to subparallel, en echelon, and in other places anastomosing or braided. In general, the veins of the Mother Lode have a northwest strike and a steep northeast dip but in the Bear Valley-Bagby segment of the lode the strike swings more to the north. In the vicinity of Coulterville the Mother Lode consists of two well defined, roughly parallel veins the more easterly of which diverges south of the Virginia Belmont mine and veers more to the southeast. Along the main length of this branch are the Louisa and Mary Harrison group of mines and the Virginia-Belmont group. A series of pocket mines is located astride the southeast-veering segment, called the Flyaway group. The more westerly vein in the Coulterville area, considered by some to be the main Mother Lode, is almost continuously traceable from the Malvina group south through the Midas and Adelaide mines and southeast toward the Merced River at Bagby. In addition to the predominating northwest-trending veins of the Mother Lode system there are structurally related minor cutter veins that join the northwest examples roughly at right angles. In some of the mines of the Peñon Blanco segment of the Mother Lode the richest ore occurred in the cutter veins rather than in the larger veins of northwest trend. In the vicinity of Mormon Bar, a few miles south of Mariposa, the Mother Lode terminates in granitic rocks.

The West Belt is made up arbitrarily of all mines located west of the Mother Lode system and the East Belt of all mines located east of it. There is no well-defined, parallel gold-quartz vein system either east or west of the Mother Lode in Mariposa County that has any comparable magnitude, although a number of East and West veins do roughly parallel the Mother Lode. Within the East and West Belts are veins of almost all attitudes, and east-northeast strikes prevail in some parts of the county instead of the more usual north to northwest trends found in the Mother Lode system.

Gold in paying concentrations is generally found localized in shoots adjacent to a large volume of valueless vein matter. The conspicuous masses of milky quartz cropping out along the Peñon Blanco are largely devoid of gold and paying ore is found principally along the upper (hanging) wall or lower (foot) wall of the vein. In other places the high-grade ore is found in the middle of the vein flanked on both sides by barren vein matter. Masses of ore (shoots) commonly have one long and two short dimensions and in Mother Lode veins the longest dimension commonly dips downward in the vein at a steep angle. For example, most of the ore taken from the Princeton mine was from a single, almost vertical, chimney-like shoot more than 600 feet deep (Knopf, 1929, p. 84). Knopf (ibid. p. 26) states that the average slope length of most ore shoots on the Mother Lode as measured along the strike of the vein is 200 to 300 feet, although the shoots tend to be much more persistent in depth. Ore commonly occurs where veins bulge, where there is an abrupt change in strike or dip of the vein, or where a cutter vein joins the main vein. Conditions of ore formation in one mine do not, however, necessarily persist in other mines of a district or even in adjacent mines.

Lode Mines

A-J (Burkhart) Mine. Location: Sec. 26, T. 4 S., R. 16 E., M.D., near the head of Burns Creek 3½ airline miles west of Bear Valley. Owner: B. F. and Ruth L. Burkhart, Bear Valley, California own one unpatented claim.

The A-J mine was first opened in the 1920s at which time a 220-foot adit was driven. The property had been worked intermittently up to the fall of 1954, the most recent operation by the Richardson Brothers of Bear Valley terminated in May 1954. Recent production has been small with ore averaging about 0.4 oz. of gold per ton.

Gold occurs free and with sulfides in a quartz vein 1 foot to 4 feet wide, the vein striking north and dipping steeply east. The wall rock is meta-augite andesite (greenstone) of Upper Jurassic age belonging to the Peñon Blanco member of the Amador group (see Taliaferro, 1943, pp. 282-284). A 150-foot shaft and three levels 35 feet apart are the principal active workings. Vein minerals include pyrite, chalcopyrite and free gold with minor amounts of green copper carbonates. Milling is done in a small Gibson mill which remains on the property.

Adelaide and Anderson Mines. Location: NE¼ sec. 22, NW¼ sec. 23, T. 3 S., R. 16 E., M.D., in the southern end of the Big Bend Mountains 4 miles south of Coulterville and 1 mile north of the Merced River. Ownership: Alfred W. Stickney, 435 Hillcrest Road, San Mateo, California owns two patented claims, the Adelaide and Anderson, and two unpatented millsites on the Merced River.

The Adelaide and Anderson claims were located during the late 1860s or early 1870s. By 1874 the claims had become part of a group that included the Midas, Crown Lead and Crown Peak claims. These were surveyed for patent purposes in 1874 and patent was established by Fred and Mary MacCrellish about 1875. The Adelaide and Anderson claims were worked by the MacCrellishes in the late 1870s and early 1880s first by open cuts and then underground. During this period most of the workings were driven and most of the stoping on the main ore shoot in the Adelaide mine was accomplished. A mine accident in 1885 resulted in the death of Fred MacCrellish and injury to his wife, and mining was discontinued. By 1895 ownership of the mines had passed to Robert E. McSherry of Coulterville and the Mary C.

MacCrellish estate. By 1914 the properties were under management of W. P. Edwards of Alameda. No material amount of work was done on either claim between 1885 and 1933. In 1934 leasers drove 440 feet of tunnels and drifts about 2000 feet south of the main workings on the Adelaide claim. A satisfactory ore body was not encountered there and the mines again became idle. In 1943 the properties were acquired by the present owner and some cleaning out and sampling was done on the Adelaide claim, particularly, near the main ore shoot. Since that time both claims have been idle.

The quartz vein at the *Adelaide* mine, part of the Mother Lode system, strikes N. 27° W. to N. 35° W. and dips 50° northeast (average). Its course is slightly sinuous and vein matter thickens and thins between the limits of 6 and 10 feet. The principal known ore shoot is 25 feet wide, measured along the strike of the vein, and has been stoped to a depth of 215 feet as measured in the plane of the vein. The shoot pitches northwest at about 68°. The vein has developed in a fissure that follows the east contact between a narrow mass of serpentine, on the footwall side, and a belt of black slate of the Mariposa formation on the northeast or hanging wall side. Both slate and serpentine are believed to be of Upper Jurassic age. The slate occupies a faulted synclinal trough between a large serpentine mass on the east and a thick section of meta-augite andesite greenstone of the Upper Jurassic Peñon Blanco formation (Taliaferro, 1943, pp. 282-284) on the west. The narrow mass of serpentine which forms the footwall of the main Adelaide vein has been intruded between much broader masses of slate and greenstone. Farther north the greenstone is in direct contact with slate.

In addition to the massive milky quartz, so prominently exposed on the surface of the Adelaide claim, vein matter in numerous places consists of a banded or ribbon-structure of alternating quartz and slate or quartz and talcose serpentine layers. In other places vein matter consists predominantly of quartz, ankerite and mariposite, both massive and banded. Pyrite heavily impregnates the vein material at numerous points. Gold occurs partly in the free state and partly in intimate mixture with pyrite. Associated ore minerals are galena and chalcopyrite. Presence of tellurides mentioned in an old account by Fairbanks (1890, p. 57) has not been confirmed. According to Fairbanks the best ore is found in a 2-foot-thick tabular mass on the footwall side of the vein.

The most important workings are at the north end of the claim in the vicinity of the principal ore shoot. These originally consisted of the 100-foot-deep Cobb inclined shaft; the 350-foot-long Cobb tunnel, driven northwest on the vein and intersecting the Cobb shaft 230 feet from the tunnel portal; a winze or interior shaft sunk about 100 feet from the tunnel portal; and two shallow inclined shafts with minor drifts. One of the two auxiliary shafts is 200 feet north of and the other 140 feet south of the Cobb shaft.

About 1,000 feet south of the Cobb tunnel portal is the entrance to the Boarding House tunnel driven south to southeast along a secondary vein and having three segments 60, 150 and 30 feet long, respectively. About 210 feet from the portal of this tunnel is a winze 60 feet deep sunk on the vein. This is believed to have been connected with a lower west-trending tunnel, now inaccessible. Two shafts are located south of the Boarding House tunnel, one 100 feet deep and the other 60 feet deep.

About 2,000 feet southeast of the Cobb shaft is a 290-foot crosscut tunnel and connecting 150-foot drift driven west and northwest. The drift appears to be on a different vein than the main workings, a narrower one about 2 feet wide. These workings are largely southeast of the Adelaide claim boundaries.

In addition to the aforementioned workings there are several superficial open cuts, pits and short tunnels. The total length of development workings is more than 2,500 feet. The stoped part of the ore shoot totals roughly 130,000 cubic feet.

Little is known concerning the tenor of the ore in the Adelaide mine and the present owner was unable to reach the ground below the caved stopes in the vicinity of the main ore shoot. Samples taken by the owner at various places in the workings assayed from 1 dollar to 7 dollars per ton at the present price of gold. Future development work should explore the ground below the stoped area by cleaning out and deepening the winze from the Cobb tunnel.

The *Anderson* mine is a quarter of a mile east and slightly south of the Adelaide mine. The main vein strikes about N. 15° W., dips northeast at an average of 42° (Turner and Ransome, 1897, economic map), and averages 4 to 12 feet wide. Little or no work has been done on it since 1885. The workings, all caved and inaccessible, consisted of two inclined shafts, three tunnels and two short open cuts. The amount of stoping done is not known. Wall rocks are slate but there is a small intrusion of granodiorite on the southwestern part of the claim. The more northerly shaft, 75 feet deep, is sunk at the geographic center of the claim and once connected with a 175-foot tunnel to the surface bearing N. 75° E. The other shaft was originally 120 feet deep and was connected to the surface by a 350-foot-long tunnel trending N. 60° W. A third tunnel 120 feet long was driven N. 15° W. along the vein. There is no record of production for the Anderson mine and no data as to the tenor of the ore.

Annabelle Prospect. Location: Sec. 19, T. 35, R. 17 E., M.D., 4 airline miles southeast of Coulterville and 3½ airline miles northwest of Bagby on the northwest side of Scotch Gulch at its intersection with Highway 49. Ownership: Mr. and Mrs. Sherman S. Pickard and Bryan A. Miller, P. O. Box 36, Coulterville, California, own one unpatented claim.

The Annabelle prospect is a small pocket mine opened in 1952. The mine workings lie along a line of small, discontinuous quartz veins which strike slightly east of north and dip 40° east. The vein system lies at or close to the contact of serpentinized peridotite lying to the west, and slightly older metavolcanic greenstones lying to the east. A quartz diorite dike intruded along serpentine greenstone contact forms the footwall of the veins and the hanging wall is meta-andesite greenstone. Next to the quartz veins is a narrow zone of fractured greenstone and talc schist commonly cut by quartz stringers. The fractured greenstone and in some places the adjacent greenstone wallrock is mineralized and carries pyrite and auriferous pyrite. The quartz veins and stringers carry free-milling gold, often in pockets. Serpentinized gabbro forms the hillslope to the west across Highway 49.

Workings consist of a shallow shaft inclined 40° east with a 16-foot drift driven northeast along the vein from the bottom of a short crosscut. About 30 feet northwest of the shaft a horizontal tunnel has been driven northwest.

Some good specimen material has recently been obtained from this mine and there has been a small but fairly steady production since 1952. Work is done entirely by hand methods and there is no mill connected with the property.

Argo (Pioneer) Mine. Location: Secs. 15, 16, T. 2 S., R. 17 E., M.D., 7 airline miles northeast of Coulterville in the Greeley Hill district. Accessible by three-quarters of a mile of dirt road north from the Coulterville-Kinsley road. Ownership: Walter D. McLean, Coulterville, California, owns two unpatented claims, the Argo and the Pioneer.

The Argo property has been owned by the McLean family since the early 1920s. It was leased from Walter McLean in 1931 by C. A. Gillis of Tuttletown and J. H. Hollbrook, Jr., of San Francisco. U. S. Bureau of Mines records show an intermittent production from the mine between 1923 and 1935. During the winter of 1937 two men recovered $76.00 worth of gold in 3 days from soil mantle in a small gulch south of the Argo shaft (Julihn and Horton, 1940, p. 135). Milling of 24 tons of dump material in 1949 yielded 18 oz. of gold

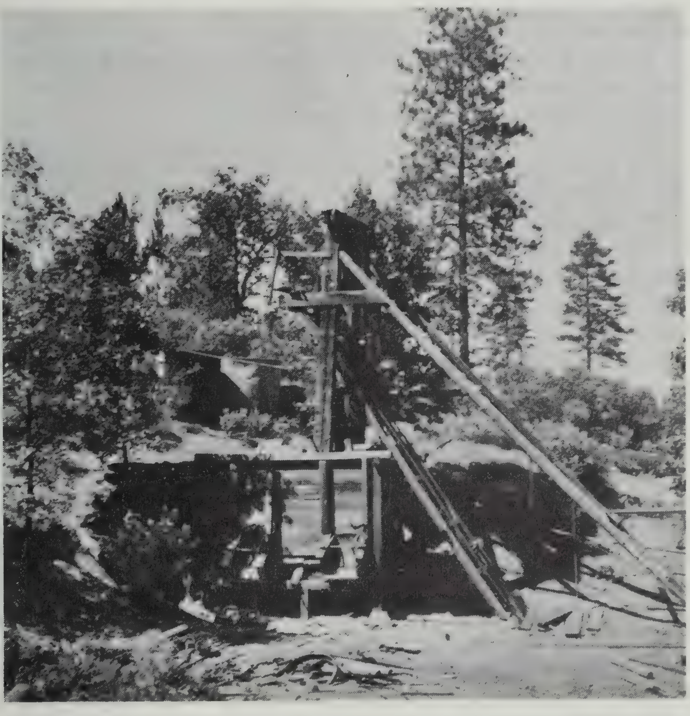

Figure 17. Headframe, ore bin and water tanks at the Argo gold mine in the Greeley Hill district 8 airline miles northeast of Coulterville. The mine is noted for pockets of high-grade ore.

or an average of $26.25 per ton. Except for assessment work the claims have been idle since 1949.

The Argo vein occurs in a shear zone striking N. 10° W. to N. 15° W. and dipping 50°-55° E. It has an average width of 2 feet and a maximum width of 5 feet. In some places brecciated wall rocks have received a stockwork of quartz stringers. Wall rocks are blue-black quartz-biotite hornfels, black quartzite and a medium-grained, altered intrusive rock, either diabase or diorite. According to the owner the high-grade ore occurs in small shoots and pockets in which specimen gold is associated with quartz and pyrite. Two ore shoots were discovered at or near the surface and about 100 feet apart (Julihn and Horton, 1940, p. 135). One about 40 feet long and 75 feet deep yielded 150 tons of ore from which 120 oz. of gold was extracted. The second shoot has been worked from the surface to a depth of 200 feet and has yielded 408 oz. of gold from 800 tons of ore or an average of slightly better than 0.5 oz. per ton ($17.85 per ton). This ore shoot was 30 feet long on the 50-foot level, but lengthened to 120 on the 100-foot level and tapered to 40 feet long on the 200-foot level. Ore remaining in the shoot on the 200-foot level is said to average about 1 oz. of gold per ton (Julihn and Horton, 1940, p. 135)—calculated to the present price of gold—from slightly more than 1000 tons of ore. The total recorded production of the mine is about $18,500.

Workings consist of several open cuts and a 200-foot inclined shaft with several levels and stopes. Equipment on the property includes a 4-inch jaw crusher, 3 stamps, amalgamating plates, 2 concentrating tables, a dismantled steam hoist and skip. The wooden headframe and shaft are in a fair state of repair but the mine is partly flooded. There are several serviceable buildings as well as the mill. Sufficient water for milling purposes is obtained from the mine.

Badger (Prescott) Mine. Location: Sec. 2, T. 5 S., R. 16 E., M.D., on the Eldorado Creek road between the Mount Gaines and Number Nine mines or about 6½ miles by road from Hornitos. Adjoins the Number Five mine on the north. Ownership: Mrs. Charles B. Cavagnaro, Hornitos, California owns the Prescott lode claim and mill site.

The Badger mine was discovered in the 1850s and is reported to have yielded $80,000 from surface workings during the early days of its history. Most of the later activity at the mine has not been recorded, but ownership has been in the Cavagnaro family for more than 30 years. The last work done on the mine was by C. S. Shafer and son of Hornitos in 1934. A small production was recorded at that time.

The Prescott vein is a rather sinuous, north-trending vein 1 foot to 3 feet wide dipping 30-45° east. Judging from the numerous shallow pits and other surface workings there must be several other parallel stringers or small blanket veins. Near the end of the line of main workings on the Prescott vein is a west-striking, nearly vertical cutter vein which has been stoped for a distance of over 500 feet. It is 1 foot to 3 feet wide and consists principally of milky quartz with abundant pyrite and some chalcopyrite. The quartz contains many vugs lined with crystals. The Prescott vein is of similar character. The authors were unable to determine whether the west-trending line of workings is part of the Badger mine or not. Wall rocks are blue-black, massive, spotted slate, schistose greenstone, black hornblende schist and hornfelsic slate, probably of Upper Jurassic age.

The Prescott vein is developed by several west and northwest-trending crosscut adits driven from the east slope of the ridge and a few short ones driven from the west side of the ridge. There are extensive drifts and stopes connecting with these workings and the whole hillside is covered with pits. Several of the crosscuts are accessible but in need of cleaning out, and workings below the lower adit levels are flooded (January, 1956).

Bandarita (Bandaretta, Eclipse, Goodwin). Location: NW¼, sec. 7, T. 3 S., R. 18 E., M.D., on the North Fork of the Merced River at its confluence with Gentry Gulch 11 airline miles east of Coulterville. Ownership: W. Lee Brown, c/o W. J. Beatty, Coulterville, California, owns 4 patented claims, the Bandarita Nos. 1 and 2, Little Fort Knox and Fort Knox No. 2. Nelson M. Leoni, c/o Dolores Pharmacy, Carmel-by-the-Sea, California, owns three patented claims, the Kinsley Nos. 1, 2, 3. In September 1954, the mine was accessible only by trail because of a washout on the Gentry Gulch road.

The Bandarita mine was discovered in 1856 (Browne, 68, p. 33) by Thomas E. Palmer and profitably worked almost continuously for more than 30 years. During the first 20 years the Goodwin Brothers and Peter Wynant were the principal operators. In 1873 operation of the mine was taken over from the Goodwins and Wynant by a San Francisco company under management of a man named Hanagan (Eng. and Min. Jour., 1873, vol. 16, no. 26, p. 412). By 1874 management had reverted to the Goodwin Brothers (Min. Sci. Press, 1874, vol. 29, no. 9, p. 133) who in a single mill cleanup took 25 pounds of gold from 100 tons of ore! By August 1876 management of the mine had passed to Levi Keyes, presumably still under ownership of the Goodwin Brothers (Min. Sci. Press, 1876, vol. 33, no. 10, p. 157). More than $160,000 was spent for mine machinery between 1872 and 1876 entirely from proceeds of the mining operations. About Jan. 17, 1880 a new 10-stamp mill run by water power was put into operation (Min. Sci. Press, 1880, vol. 40, no. 3, p. 37). Ownership passed to P. P. Mast of Coulterville about this time and C. L. Mast took over as superintendent. The Masts began to drive a tunnel from the level of the mill to crosscut the main vein 1200 feet from the surface outcrop (as measured along the vein). This ultimately reached a length of 1364 feet and encountered ore averaging $25.00 per ton. According to Julihn and Horton (1940, p. 141), the period 1881 to 1887 was the most productive in the mine's history. By 1889 the most of the ore above the lowest tunnel level had been stoped out and the mine became idle (Eng. and Min. Jour., vol. 42, no. 22, p. 407). Intermittent work was done from 1890 to 1898. Early in 1898 Lafayette Gold Mining Company of San Francisco leased the mine with the idea of cleaning out the lowest tunnel and sinking lower from the tunnel level. (Eng. and Min. Jour., vol. 65, no. 8, p. 229.) Little is known of the results of this operation, but by 1904 ownership had passed to Rodgers and Loomis of Springfield, Ohio. There is no record of work of any extent on the mine from 1904 to 1928 when ownership passed into the hands of Gentry Gulch Consolidated Mines Company of San Francisco (Laizure, 1928, p. 89). This operation was apparently short-lived and there is no known record of production from the Bandarita mine at that time. About 1937 the mine was leased from the owners, Nelson M. Leoni and J. E. Brown, by four partners, William Beatty, W. M. Boyer, Carl Crouse and G. A. Ogden (Julihn and Horton, 1940, p. 141) who operated the mine until 1943. Since 1943 the mine has been idle.

The Bandarita mine is credited with a total production of $1,520,000 much of which was mined between 1881 and 1887, according to Julihn and Horton. During the last period of activity, from 1937 to 1943, approximately $40,000 in gold and silver was obtained from 7362 tons of ore (U. S. Bur. of Mines records), the tenor of the ore being $5.42 per ton or considerably lower than the ore milled in the 1880s.

The principal vein at the Bandarita mine strikes N. 84° W. and dips about 47° S. Its width varies from 2 to 10 feet. Wall rocks are slate, quartz-biotite hornfels and granitic dike rocks. The metasedimentary series has been assigned to the Paleozoic Calaveras formation (group) by Turner and Ransome (1897).

In addition to native gold the ore contains pyrite, galena, sphalerite and tetrahedrite, the best ore containing considerable tetrahedrite. Presence of tellurides, mentioned by S. Rudolph (Min. and Sci. Press, 1880, vol. 40, no. 11, p. 162) has not been confirmed by later writers. Julihn and Horton (1940, p. 141) visited the property in 1938 and the following data is drawn largely from their report. There are four granodiorite dikes which strike roughly north and intersect the vein approximately at right angles to it. The vein has been faulted at these intersections with throws of from 1 foot to 42 feet.

The mine is developed by a 1364-foot crosscut adit, the portal of which is 50 feet above river level, and by six adits driven along the strike of the vein, two on the east side of the hill and four on the west slope of the hill. The longest of these adits, 800 feet in length, is driven into the east slope and taps three ore shoots stoped from the surface to various depths between 75 and 650 feet. The crosscut adit taps the vein about 850 feet vertically from the surface or 1200 feet as measured along the vein.

In 1938, lessees stated that there was 275,000 tons of gob (broken ore) in the old stopes of the mine that would pay to mill at costs prevailing at the time and at the prevailing price of gold. The lessees were, however, mining unbroken ore from the Goodman (Goodwin (?)) shoot which was reputed to average 0.57 oz. of gold per ton.

Black Hill (Pumpkin) Mine. Location: E½, sec. 33, T. 2 S., R. 16 E., M.D., half a mile northwest of Coulterville. Adjoins the Margaret claim on the north. Ownership: Louise A. Boyd, 265 California St., San Francisco 11, California owns 40 acres of patented land.

The Black Hill or Pumpkin mine is the most northerly mine in the Mary Harrison group, all of which are aligned on a branch of the Mother Lode vein system commonly called the east branch. The east branch is roughly en echelon to the west branch on which are aligned the Malvina group of mines. The two branches are approximately 4700 feet apart.

The mine probably was discovered and first worked at about the same time as the Mary Harrison, about 1867. There is little record of activity before the 1890s although considerable development work must have been done. There was a 600-foot tunnel on the property as early as 1895 (Storms, 1896, p. 216) at which time the owners were Clark and McLaymont of Coulterville. By 1900 ownership had passed to John Boyd and the mine had been reopened under the management of J. J. Dolan. A new shaft was sunk to a depth of about 100 feet (Eng. and Min. Jour., vol. 70, no. 22, p. 647) and some rich ore was discovered. Very little work has been done on the property since 1902.

At the Black Hill mine the east branch of the Mother Lode strikes N. 35° W. and dips about 45° northeast. The vein is close to the contact between a serpentine intrusion and slate of the Mariposa formation, but at the surface the wall rocks are entirely serpentine. Vein matter is chiefly quartz-ankerite-mariposite rock and the vein is more than 20 feet wide. Considerable low-grade ore is found as pyritic impregations in serpentine wall rock adjacent to the vein.

Workings consist of a main inclined shaft, surmounted by a wooden headframe and ore bin, two tunnels driven northeast and several auxiliary shafts and stopes. The main shaft is watered and partly caved and the other workings are all caved and inaccessible. There is a tool shed in good condition on the property (September 1954) but no mining or hoisting machinery.

Bondurant (Hathaway-Bondurant). Location: Sec. 25, T. 2 S., R. 17 E., M.D., 12 miles east of Coulterville near the North Fork of the Merced River. Ownership: A. E. Adams, et al., 367 Maude Ave., San Leandro, California own one patented claim.

The Bondurant mine is the second oldest patented mine in the county, patent having been issued in 1856 (Julihn and Horton, 1940, p. 138). It was mined by hand methods and ore was treated in arrastras during the early years of operation, and one of the early owners was Judge Bondurant for whom the mine is named. By the late 1870s ownership had passed into the hands of Joshua Hendy of San Francisco who in 1879 sold the Bondurant and Martin-Walling mines to an eastern company for $80,000 (Min. and Sci. Press, vol. 39, no. 1, p. 5).* At that time a 10-stamp mill was operating 24 hours a day on $30.00 per ton ore. After a period of inactivity in the early 1880s the Hathaway-Bondurant Gold Mining Company was organized in 1887 with a capitalization of $1,000,000 (Min. and Sci. Press, vol. 44, no. 10, p. 173) and the mine was placed under the management of T. T. Hathaway. This operation ceased in 1891. After 5 years of intermittent activity the mine was unwatered and sampled by the Bruner Brothers of St. Louis, Missouri, Charles Bruner, superintendent. About 1902 the mine was taken over by the Boston and Mariposa Mining Company, Fred Whitman, superintendent, but this operation was also short-lived. In July 1911 under the management of George H. Gerkin, specimen ore was discovered on the 300-level and another high-grade shoot was discovered soon thereafter between the 150 and 200 levels (Min. and Sci. Press, vol. 103, no. 3, p. 90, 148). In 1913 ownership passed to the Bondurant Gold Mining Company, A. L. Adams, Bridgeport, Connecticut, the principal owner. A crosscut adit started by previous owners near the level of the Merced River, calculated to strike the vein at a distance of about 1400 feet from the portal, apparently was lengthened under this management. The adit apparently was only driven 945 feet (Lowell, 1916, p. 577). In 1916 the mine was sold by Adams to George R. Stone, Bridgeport, Conn., but little or no work was done under this ownership (Min. and Sci. Press, vol. 102, no. 18, p. 106). From 1926 to 1928 or 1929 the mine was operated by the Bondurant Mining Trust of Modesto, a partnership of Walter and Arthur Ritz (Laizure, 1928, p. 81). The Ritz management extended the crosscut adit started by the Adams operation to 1400 feet. From about 1929 to October 12, 1940 the Bondurant Mining and Milling Company of San Francisco operated the property and it was during this period that the largest production was recorded. The known production up to October 12, 1940 is about $292,000. From that date to October 15, 1942, when closed by War Production Board order, the Boston-California Mining Company mined between 12,000 and 14,000 tons of ore which yielded approximately $98,000. Consequently the total known production of the mine is $390,000. Between 1911 and 1915 approximately 746 tons of ore mined yielded 431.95 oz. of gold, 259 oz. of silver and 3672 pounds of copper. From 1931 to 1940 a total of 16,596 tons of ore mined yielded 7879.92 oz. of gold and 5176 oz. of silver.

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* Walter McLean, Coulterville, California, suggests that this transaction probably involved the Bandarita mine rather than the Bondurant.

There are three major, roughly parallel veins on or closely adjacent to the Bondurant property known as the Bondurant, Reynolds, and Louisiana. No material amount of work has so far been done on the Reynolds or Louisiana veins on the Bondurant property. The Bondurant vein strikes generally N. 65° W. and dips 35° to 45° E. at the surface. It is about 3 feet wide where it crops out at the surface but averages 4 feet wide at depth (McLean, W. D., personal communication, 1956). Vein matter now exposed at the collar of the shaft is chiefly hydrothermally altered, micaceous dike-rock, but most of the gold occurs in quartz with pyrite, chalcopyrite, sphalerite and galena. According to the recorded production figures ore has average 0.48 oz. of gold and 0.31 oz. of silver per ton. Much of the dump material is pyrite-impregnated slate and other wall rock which must carry some gold.

Wall rocks enclosing the Bondurant vein are crumpled slates, slaty mica schists and coarser-grained gneisses, presumably part of the Paleozoic series generally known as the Calaveras group. The precise character of the altered dike-rock associated with quartz vein-matter cannot be determined from hand specimens, but it probably is a fine-grained, biotite-rich granodiorite.

In August, 1954, the principal working at the Bondurant mine was a 10x12-foot shaft inclined 45° toward the northeast. This was filled with debris below an inclined depth of about 100 feet. According to Julihn and Horton, the last writers to visit the mine while it was operating, the shaft was 412 feet deep and had a total of 2500 feet of drifts on 5 levels, the 100, 150, 250, 300 and 350. In 1938 the crosscut tunnel, begun near river level and driven 945 feet in 1913-14, had been lengthened to 1100 feet. At that time the company planned to continue the tunnel 600 feet farther until it intersected the vein. The projected point of intersection is approximately 1100 feet from the surface outcrop of the vein as measured along the dip (Julihn and Horton, 1940, p. 138). There is no record showing whether the projected 1700-foot tunnel was ever completed or not. The mine was shut down about 1942 by War Production Board Order L-208 and has been inactive since that time. All equipment has been removed from the property and all of the workings except the upper part of the shaft were inaccessible at the time of the authors' visit in August 1954.

Buena Vista Group (Busch, Washington-Buena Vista). Location: Secs. 20, 21, 28, T. 4 S., R. 18 E., M.D., in the Colorado district 5 airline miles north and slightly west of Mariposa via State Highway 49 and the Saxon Creek Road. Ownership: C. W. and Velma Worley, Mariposa, California own three patented claims, the Washington, Buena Vista and Phoenix. Once included the Talc, Lucky Lindy and Charles claims.

The Buena Vista group of mines was first opened in 1882 or 1883. In January 1884 a 10-stamp steam mill was put into operation by the O'Gorman Brothers (Min. and Sci. Press, vol. 48, no. 5, p. 88). By May 8, 1886 the main shaft had reached a depth of 100 feet with Lorenzo Alvord in charge of operations (Mariposa Gazette, May 8, 1886). Early in 1887 the mine was leased or bonded from a Dr. Turner to Emmanuel San Pedro who operated the property for several years. (Min. and Sci. Press, vol. 54, no. 4, p. 56) In 1892 an 8- or 9-inch wide ore shoot was struck in the vein at a depth of 15 feet which ran $62.00 per ton in gold and $1.67 in silver. (Eng. and Min. Jour., vol. 54, no. 17, p. 397) The mine was idle much of the time between 1893 and 1916. In 1917 it was reopened by W. M. Brice, probably under lease from L. F. W. Busch (Castello, 1920, p. 109). About 1919, Busch sold all of his holdings except a talc claim, the Washington claim going to Pacific States Syndicate of Los Angeles (Castello, 1921, p. 141). None of the claims appear to have been operated to any extent until 1927 when the Buena Vista group of claims was acquired by Consolidated Gold Fields of Mariposa, Belle McCord Roberts of Long Beach, President (Laizure, 1928, p. 120). This company did considerable cleaning out and sampling and several shoots containing milling-grade and high-grade ore were found (Laizure, 1928, p. 120-121). This operation apparently did not survive the crash of 1929 and depression of the 1930's and the claims have been idle during most of the period 1929-1955.

The principal vein on the Buena Vista claims is 2-7 feet wide, strikes N. 70°-75° W. and dips steeply northeast. There is at least one parallel stringer vein. Wall rocks are slate and metavolcanic porphyries. In 1914 the principal working was a 180-foot shaft with 140 feet of drifts, one winze of unknown length and a 67-foot crosscut tunnel (Lowell, 1916, p. 578). According to Laizure (1928, p. 120) most of the workings are on the Washington and Buena Vista claims. He mentions a tunnel driven on a stringer vein, a crosscut opening about 200 feet from the main shaft and drifts on the vein from the crosscut tunnel. Assays made in 1927-28 by Techow and Davis of Sacramento varied from $6.40 to $32.96 per ton (Laizure, 1928, p. 120). The mine is idle and the property was not visited during this investigation. The foregoing data were abstracted from the literature and from records of the U. S. Land Office at Sacramento.

Buffalo (San Domingo) Mine. Location: SW$\frac{1}{4}$, sec. 13, T. 4 S., R. 18 E., M.D., about 4 airline miles north of Midpines on Trabucco Creek. Ownership: Vernon and Clara Tharp, 1850 Central Ave., Alameda, California own one claim and a mill site.

Little has been written of the early history of this mine. It was described as an old mine in 1910 at which time a large body of milling-grade ore had been developed under direction of R. L. Mann (Min. and Sci. Press, vol. 101, no. 15, p. 486). The most recent period of activity was from 1932 to 1940, mainly under the management of the Gabriel Mining Company of Midpines. There is no machinery on the property and the workings are covered by dense brush (September, 1954). Local prospectors report that entry to the mine may be made through the air shaft and that the tunnel is open for nearly 300 feet past the caved portal. During the last period of activity, a little more than $15,200 in gold and silver was taken from the mine from an unknown tonnage of ore.

Rocks exposed in the vicinity of the workings are slate, greenstone and various granitic rocks. According to Castello (1920, p. 137) early workings explored a quartz vein 2 feet wide carrying free milling gold, having a northwest strike and northeast dip of 50°. He described the footwall as slate and the hanging wall as granite. Workings at that time consisted of a 400-foot tunnel, a 180-foot air shaft and several winzes and raises. Laizure (1935, p. 29) states that the main quartz vein varies from a few inches to 7 feet wide with several feeder veins, all badly fractured. Ore shoots were described as short and irregular. According to his account the vein crops out at the surface, has a north strike and an east dip of 26°. Workings in 1935 were reported to consist of a 310-foot tunnel and connecting winze, reaching 400 feet below the outcrop and with 500 feet of drifts on the vein. Also, 1000 feet of upraises and intermediate drifts and one stope 100 x 150 feet.

Campo (Campodonica Italian) Mine. Location: NW$\frac{1}{4}$, sec. 16, T. 5 S., R. 16 E., M.D., 1 mile east of Hornitos. Ownership: Not determined.

The Campo mine was discovered in early gold rush days and worked in a small way with an arrastra during the 1850s and 1860s. In 1874 the lower level of the Campo mine reached 110 feet below the surface and the shaft was 205 feet deep on a 45° incline (Min. and Sci. Press, vol. 29, no. 4, p. 53). At that time the vein was 8 feet wide, but only a small amount of the width constituted ore. By 1876, a 10-stamp mill had been erected which milled 10 tons of ore in a 24-hour period, ore running $15.00 per ton at the prevailing price of gold (Min. and Sci. Press, vol. 33, no. 12, p. 189). Chinese labor was employed. After a period of inactivity of unknown duration the mine was reopened in 1896 by the Campodonica Mining Company under the direction of James Kennedy. (Min. and Sci. Press, vol. 73, no. 11, p. 222.) Under this management the mine yielded 387 oz. of gold from unknown tonnage of ore (U. S. Bureau of Mines records) but the mine was again closed down in 1898 or 1899. During 1937-1939 the mine was operated by a group headed by N. L. Wagner, L. G. Corwin and Claude Shafer of Hornitos. In this period 356 tons of ore were mined which yielded 238 oz. of gold and 96 oz. of silver. In 1938, the old dump sampled $8.42 per ton (Julihn and Horton, 1940, p. 125.) The mine has not been operated since 1940.

According to Julihn and Horton, the last writers to visit the mine while it was operating, the quartz vein averages 4 to 5 feet wide between a schist footwall and a porphyry (greenstone) hanging wall. It strikes north and dips 40° to 45° east. The principal working is an inclined shaft 230 feet deep from which a large but unknown footage of drifts has been driven. In 1938, the shaft was being cleaned out and retimbered, a cave-in having occurred 40 or 50 feet below the collar of the shaft. The rocks in the vicinity of the mine are slates and schists of the Upper Jurassic Mariposa and Amador groups of rocks.

Carson (Bouvier) Mine. Location: Secs. 3, 4, T. 4 S., R. 16 E., M.D., in Hunter Valley 8 airline miles north of Hornitos. Adjoins Iron Duke mine on the south. Ownership: Not determined, probably Inez Bouvier, et al., 1431 Moraga St., San Francisco, California.

The Carson mine consists of four adjoining unpatented claims, the Carson, Carson No. 1, Carson No. 2 and Bouvier. The Carson claim adjoins the Iron Duke claim on the south, the others extending southeast in the order named. All are on a well-known bluish quartz vein, locally called the Blue Lead, which strikes N. 30°-35° W. and dips about 60° east. The Blue Lead is crossed nearly at right angles by several cutter veins wherein some of the best ore is found. The Blue Lead varies from 2 to 20 feet wide and the cutter veins from 2 to 4 feet wide. The main vein is on or close to the contact between the Hunter Valley chert and meta-augite andesite greenstone of the Amador group. Both these units are of Upper Jurassic age. In general, chert forms the hanging wall and greenstone the footwall. The principal working, located on the Carson claim on a cutter vein about 150 feet east of the Blue Lead, is a 125-foot inclined shaft. There are several other prospect pits. The mine was once equipped with a 5-stamp mill, but this burned in 1868 (Castello, 1921, p. 108). The mine is idle and there is no equipment on the property.

Champion I Mine. Location: Secs. 28, 33, T. 2 S., R. 16 E., M.D., on Blacks Creek 1¾ miles N.W. of Coulterville. Ownership: Car Da Mining Company, a trust estate (½) and Adelaide M. Ray (½), c/o C. P. Rose, 1259 North Fuller Ave., Hollywood, California, own 1 patented claim consisting of 10.37 acres.

The Champion I mine is a very old property probably located in the 1850s. Little is known of the early history of the mine except that it was known to be active in 1878. From 1903 to 1905 the mine was operated intermittently by C. E. Van Meter under the management of a Mr. Chandler of San Francisco. The main shaft was 100 feet deep in 1904 (Min. and Sci. Press, vol. 88, no. 11, p. 184) and 200 feet deep in 1905 (Min. and Sci. Press, vol. 90, no. 12, p. 197). By 1906 ownership of the mine was held by N. S. Ray, the Mentzer Brothers and Daniel Wagner. A strike of rich ore was reported in the mine in September 1906 (Min. and Sci. Press, vol. 82, no. 12, p. 561). In 1910 the mine was under lease to Bagby, Wilburn and McQuinn who had an operating mill and employed 15 men. In February 1910, a single pocket of gold yielded $74444 (Min. and Sci. Press, vol. 89, no. 7, p. 388). In the fall of 1910 one mill cleanup from 250 tons of ore milled yielded $14,800 (Min. and Sci. Press, vol. 90, no. 19, p. 926). About 1914, the mine was leased to C. I. Mentzer, et al., of Coulterville who milled several thousand dollars' worth of ore averaging $45 per ton. In 1917, the Champion Mining Company of Los Angeles was permitted to issue 675,000 shares of stock to C. H. White and associates for reactivation and redevelopment of the mine. This company constructed a 10-stamp mill and milled a small tonnage of ore which ran about 5 oz. of gold per ton (U. S. Bur. Mines records). By 1920, ownership of the mine had passed to Mrs. D. Wagner, Mrs. N. C. Kay and Mrs. M. A. Mentzer (Castello, 1921, p. 110). By 1936, ownership of the mine had passed to the Car Da Mining Company, Frank A. Notterman of Sonora, president and general manager. In 1938, 16 men were employed. The mine has been idle since the period 1936-38. All equipment and buildings have been removed from the property except a tool shed and cabin. The workings are full of water (September, 1954).

The recorded production of the Champion I mine since 1900 is about $146,200.00 with the total production somewhere between $150,000.00 and $200,000.00. About $67,000.00 in gold and silver was produced during the last period of activity, 1936-1939.

The long direction of the main shaft is oriented N. 70° W. and it dips 55° northeast. The Champion claim is also oriented about N. 70 W. (U.S. Land Office records) and this is presumably parallel to the strike of the vein, which does not at present crop out strongly at the surface. Castello (1921, p. 110), Laizure (1928, p. 83) and Julihn and Horton (1940, p. 111) all state that the main vein strikes N. 17° E. and dips 45° SE. between slate walls, but these data are evidently in error. There is no slate on the dumps or near the workings and no evidence that the vein strikes northeast. Rock on the dumps is serpentine and greenstone and there is a serpentine-greenstone contact less than 100 feet east of the main shaft. Vein matter on the dumps consists of sulfide-impregnated quartz and quartz-ankerite-mariposite rock. Also in the dumps is a large quantity of sulfide-impregnated wall rock which probably constitutes low-grade ore. According to Julihn and Horton the ore contains free gold, pyrite, galena, tetrahedrite and sphalerite. They state that the main shaft is 440 feet deep with levels at 140, 240, 340, and 440 feet. They also mention a 200-foot exit shaft and 2000 feet of drifts, crosscuts and raises. In 1938 the mine made about 40,000 gallons of water per day in summer and 60,000 gallons per day in winter (Julihn and Horton, 1938, p. 111). A complete account of the milling practice in 1938 is described by Julihn and Horton. The mill has been removed from the property.

There are two shafts of unknown depth about 1,000 feet southwest of the main shaft which apparently are on the Champion claim. The relationship of these shafts with the other workings could not be determined. One of these may be the exit shaft mentioned by Julihn and Horton.

Champion II Mine. Location: Sec. 34, T. 3 S., R. 18 E., M.D., 1¼ miles south of Colorado School and east of the Colorado-Sherlock Creek road, or 5 airline miles northeast of Mariposa. Ownership: Belle McCord Roberts, 2625 East Tenth St., Long Beach, California, has retained mineral rights on one claim of about 20 acres, which is part of a parcel of patented agricultural land.

The Champion II mine was discovered sometime before the 1880s about the same time as many other mines in the Colorado district. In October 1889 the mine was being operated by a partnership of James Ridgway, Colonel Dunbar and Mr. Hay. At that time it was worked from a 4x10-foot nearly vertical shaft 90 feet deep with drift levels at 60 and 90 feet run both directions from the shaft (Min. and Sci. Press, vol. 59, pp. 320, 450, 1889; Goodyear; 1890, p. 303). Five hundred tons of ore taken out during 1889-90 was reported by Goodyear to average about $12 per ton. Ore was crushed for a time in a steam-powered arrastra but this proved impractical and a 5-stamp mill was planned. Management disputes apparently resulted in termination of this period of activity. In 1919 the mine was owned by G. E. Dunbar of Mariposa but only assessment work was being done (Castello, 1921, p. 110). Late in 1927 the Champion mine was acquired along with a large group of other mines in the Colorado district by Consolidated Gold Fields of Mariposa, Inc., in which the present owner was the principal partner (Laizure, 1928, p. 84). No sustained mining was done before the depression years starting in 1929 and little has been done with the mine in recent years.

The Champion vein strikes N. 65-70° W. and varies only a few degrees from vertical. The average width is perhaps 4 feet but it locally thickens to as much as 12 feet. Vein matter is in part massive milky quartz and in part a ribbon-structure of laminated white and glassy quartz including thin sheets of slate wall-rock. Ore minerals are pyrite, galena and native gold. The vein is on or close to the contact between slaty and schistose metasediments of the Paleozoic Calaveras group and hornblende granodiorite. The granodiorite is cut by several granitic porphyry dikes the largest of which parallels the strike of the vein and is about 300 feet northeast of it.

Workings in 1919 consisted of a 96-foot shaft with levels at 60 and 90 feet. On the 60-foot level the east drift was 78 feet and the west 50 feet. On the 90-foot level there is a 60-foot west drift only. In addition there are shallow workings strung out along the vein for over 1300 feet. In August 1955 the shaft was open to a depth of 40 feet.

Clearinghouse Mine (Original and Ferguson, Anderson). Location: Secs. 16, 21, T. 3 S., R. 19 E., on the Merced River and State Highway 140 at Clearinghouse, 7 miles west of El Portal. Ownership: Mrs. Frank E. Gallagher, 211 26th St., Merced, California, owns ten patented claims, the Original, Original No. 2, South Original Extension, El Portal, Anderson, North Extension of the Anderson, Golden Rule, Golden Rule No. 2, Moonstone and Moonstone No. 2, totaling about 190 acres.

History: The more westerly group of claims, best known as the Ferguson mine, but also called the Anderson mine, was discovered about 1860, probably by the Ferguson brothers. During the 1860s the mine was operated by the Fergusons and a large tonnage of high-grade ore was extracted. The *Sonora Herald,* February 22, 1868, states that 174 oz. of gold were recovered during a week of operation of the 8-stamp mill at the Ferguson mine. This mill processed 6 tons of ore in 24 hours so that the ore must have run several ounces of gold per ton. In 1870 the mine was sold by the Fergusons to a San Francisco company for $80,000 (Min. and Sci. Press, vol. 21, no. 15, p. 252) but ownership had reverted to E. Ferguson by 1871. In February 1871, the ore was averaging $44.00 per ton (Min. and Sci. Press, vol. 23, no. 16, p. 244) and the mill had been enlarged to 15 stamps. The mine was intermittently idle during the middle 1870s but was operating full scale in 1878 under the ownership of E. Ferguson, with Robert Frances

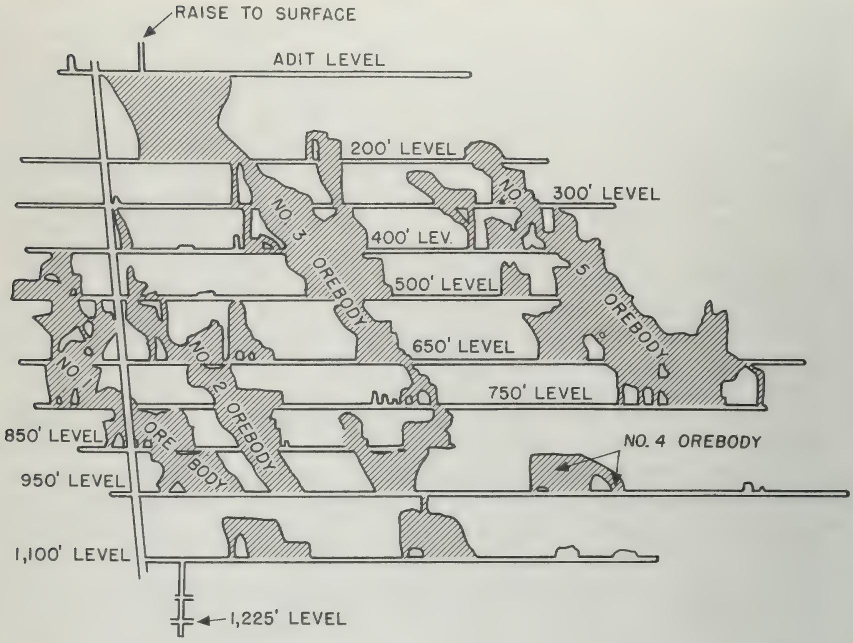
RAISE TO SURFACE
ADIT LEVEL
200' LEVEL
300' LEVEL
400' LEV.
500' LEVEL
650' LEVEL
750' LEVEL
850' LEVEL
950' LEVEL
1,100' LEVEL
1,225' LEVEL
NO. 1
NO. 2 OREBODY
NO. 3 OREBODY
NO. 4 OREBODY
NO. 5 OREBODY
ORE BODY

FIGURE 18. *A.* Longitudinal section (in the plane of the vein) of the Original vein workings, at the Clearinghouse mine just north of the Merced River in the El Portal district. The disposition of the ore-bodies is well shown. *Reproduced from fig. 1 of Engineering and Mining Journal, vol. 103, no. 16 (Young, 1929, pp. 45-48).*

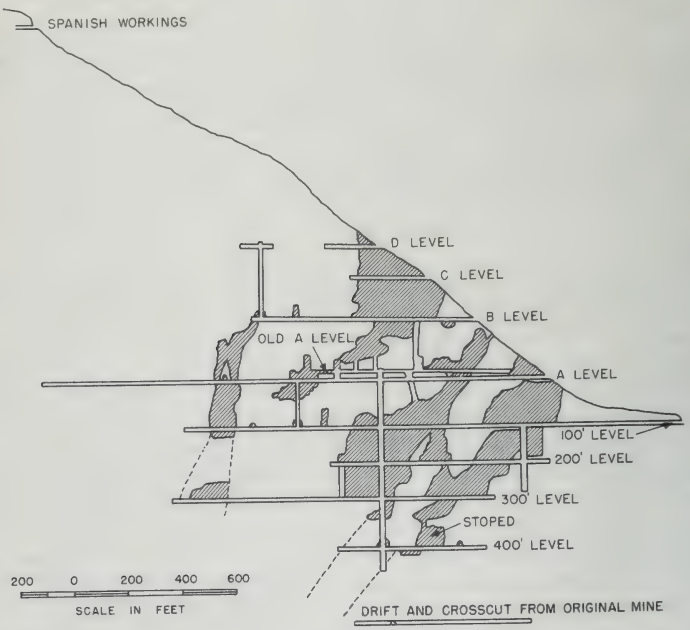
SPANISH WORKINGS
D LEVEL
C LEVEL
B LEVEL
OLD A LEVEL
A LEVEL
100' LEVEL
200' LEVEL
300' LEVEL
STOPED
400' LEVEL
200
0
200
400
600
SCALE IN FEET
DRIFT AND CROSSCUT FROM ORIGINAL MINE

FIGURE 18. *B.* Longitudinal section of the principal workings on the Ferguson vein of the Clearinghouse mine in the El Portal district, showing disposition of the ore.

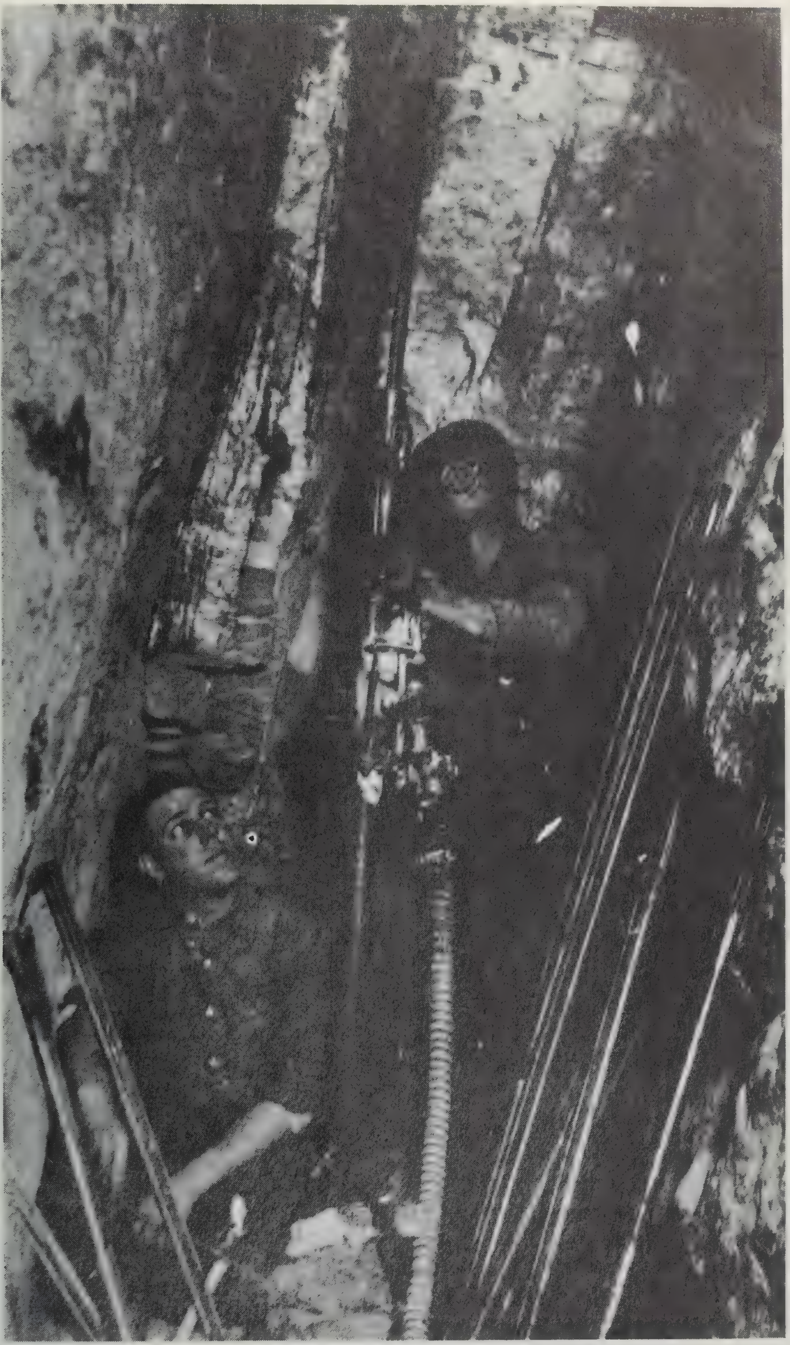

FIGURE 18. *C.* A typical underground view of the Original vein as seen in the early days of mining on the number one adit about 280 feet from the portal. The width of the vein matter, attitude and ribbon structure are clearly shown. *Reproduced from an old photograph by courtesy of Elisabeth L. Egenhoff.*

as superintendent. Ore at that time ran from $10 to $40 per ton, but in 1879 some ore ran between $75 and $100 per ton (Min. and Sci. Press, vol. 37, no. 22, p. 34; vol. 38, no. 12, p. 181).

As early as 1870 the main adit had reached a length of 1100 feet. About 1871 an underground shaft or winze was sunk from the end of the 1100-foot tunnel. This was 100 feet deep in February 1871 (Min. Sci. Press, vol. 22, no. 8, p. 115). About 1878 a second underground shaft was sunk from the main adit at a distance of about 1000 feet from the portal. This No. 2 shaft was 200 feet deep by fall of 1878 (Min. and Sci. Press, vol. 37, no. 14, p. 341).

Through 1880 the Ferguson mine continued to be an active producer and in July 1880, fifty pounds of specimen gold-quartz was sold to a jeweler for $1200 (Min. and Sci. Press, vol. 41, no. 18, p. 273). From 1881 to 1934 the mine was largely inactive. It was bonded for a short time in 1899 to J. F. Joseph and associates of Sonora (Eng. and Min. Jour., vol. 68, no. 16, p. 465); to L. and E. Mason, Incline, in 1905; and to George S. Barber of Oakland in 1910. There was no recorded production under any of these operators. By 1920, ownership had passed to Mrs. S. A. Hall and Anna K. Sherwood under the name Ferguson Consolidated Gold Mines, but the mine remained idle.

The more easterly group of claims, called the Original mine, was first located in 1908 (Laizure, 1928, p. 107). It was operated almost continuously from 1911 to 1933 by the Original Mining and Milling Company (E. C. Kocher, pres., G. M. Egenhoff, mgr., J. W. Warford, supt.), from Jan. 1, 1933 to October, 1934 by a group of lessees headed by J. W. Warford (Laizure, 1935, p. 40), and from 1934 to 1937 under lease by San Juan Ramsey Company (Boston, Mass., W. C. Smith, pres., A. S. Wyner, Incline, mgr.). About 1925 the claims of the Ferguson mine were acquired by the Original Mining and Milling Company and all ten claims of the present property were patented during that year (Laizure, 1928, p. 107). In December 1937 a flood washed out both the Yosemite Valley Railroad and the state highway. The mine closed down and has since been idle (Julihn and Horton, 1940, p. 143).

The Clearinghouse mine has been among the ten highest-producing mines in Mariposa County, the total production being in excess of $3,350,000. Claims of the Ferguson mine have yielded an early estimated production of $1,250,000 (Julihn and Horton, 1940, p. 134) and a recorded production between 1935 and 1940 of $107,000 for a total of $1,357,000. Between 1911 and 1937 the claims of the Original mine yielded 79,636.79 oz. of gold, 25,364 oz. of silver, 340 pounds of copper and 134 pounds of lead from 175,156 tons of ore. This amounted to slightly more than $2,000,000 at the prevailing gold prices, but would amount to about $2,797,900 at the present price of gold.

Geology: The Original and Ferguson veins lie on opposite sides of a north-trending sill-like mass of coarse-grained granitic rock approximating biotite granodiorite. The granodiorite has been intruded into metasediments of the Paleozoic Calaveras group roughly parallel to the slaty cleavage and schistosity. The Original vein, lying on the east side of the mass strikes N. 7°-10° E. and dips 78° east. To a depth of about 400 feet the vein lies entirely in slaty metasediments, but below that depth the wall rocks are chiefly granodiorite (Young, 1929, p. 46).

The Ferguson vein, lying on the west side of the granitic mass, strikes about N. 21° E. and dips about 70° west. In general, it follows the contact between the granodiorite and the metasediments. Metasedimentary rocks on the dump include slate, quartz-biotite hornfels, graphite-mica schist and some quartz-mica gneiss. According to Young (1929, p. 46) the slaty cleavage dips 40° east near the apex of the Ferguson vein but steepens to 78° at adit level. Three lateral quartz veins join the Ferguson vein at various angles from a northwesterly direction, the Spanish, Golden Rule and Moonstone veins. These have been superficially explored and their form is not yet certain.

Five ore shoots have been discovered in the Ferguson vein north of the underground shaft. These are roughly parallel and pitch north at an average of 60°. The shoots average 4-5 feet thick and 100 to 150 feet wide. Two of the five shoots have been stoped to depths exceeding 1000 feet, as measured on the axis of pitch. Four ore shoots have been worked in the south end of the Ferguson mine. These pitch north at angles between 40° and 70°. The character of ore is similar in most ore-shoots, arsenopyrite, galena, sphalerite and native gold occurring in ribbon quartz. In general, the sulfide content of the ore is about twice as great in the shoots of the Ferguson vein than in shoots of the Original vein (Julihn and Horton, 1940, p. 145).

Mine Workings: Inasmuch as the workings were not accessible to the authors, the following mine descriptions have been drawn largely from Young (1929) and Julihn and Horton (1940). Julihn and Horton were the last authors to visit the Clearinghouse mine while it was still in operation.

There are extensive workings on both the Original and Ferguson veins. The Original vein workings are entered by a 175-foot, west-trending crosscut adit which intersects the vein 180 feet below the outcrop. The portal of this adit is on the west side of a ravine at an elevation of approximately 1600 feet. A 2-compartment underground shaft or winze, inclined 78° east has been sunk from near the end of the crosscut adit to an inclined depth of approximately 1170 feet. The shaft serves 9 levels (below the adit level), the 200, 300, 400, 500, 650, 750, 850, 950 and 1100-foot levels. A 250-foot vertical winze with short levels at 1125 and 1150 feet is sunk from the 1100-foot level at a point 150 feet north of the main shaft and there is a 150-foot raise to the surface from the adit level. The total vertical depth explored in the Original vein is, therefore, approximately 1530 feet. Development work north of the main shaft amounts to an average of 1300 feet of drifts per level, the longest drifts being on the 650 and 950 levels. South of the main shaft the maximum distance penetrated is about 265 feet with some stoping between the 400 and 850 levels. There are extensive stoped areas north of the shaft between the adit and the 1100 levels.

From the 650 level of the Original workings 510 feet north of the Ferguson shaft a 1200-foot crosscut connects with the Ferguson vein. Owing to a faulty survey, the 600-foot drift along the vein from this crosscut did not strike the number 1 ore body and the drift was never connected to the other workings above it on the Ferguson vein. In addition to the crosscut and drift from the Original workings, the Ferguson vein is developed by 5 adit levels which are top to bottom, the D-, C-, B-, A- and 100-levels. There is also an unused former A-level roughly 50 feet above the main level (A or haulage level). The A and 100-levels are slightly over 1200 feet long; the others average less than half as long. From the A-level, a 450-foot winze or underground shaft has been sunk above 400 feet from the portal. This shaft serves the 200-, 300- and 400-foot levels. A second winze or underground shaft connects the A- and 100-foot levels about 600 feet from the portal of A-level, and there is a 200-foot winze sunk about 375 feet north of the portal of the 100-level. The 100-foot winze sunk from the end of the 1100-foot A-level in 1871 and a 200-foot winze sunk from A-level 1000 feet from the portal in 1878 do not show on the latest available mine diagrams. The latter apparently was stoped out and the former may be filled with gob or debris. Ore has been stoped to a vertical depth of slightly more than 450 feet and over a vein length of about 1000 feet.

About 1800 feet north and 1350 above the portal of the A-level are a group of old Spanish workings consisting of several short drifts with superficial connecting workings. These apparently are on the North Extension of the Anderson claim.

Grade of Ore: The ore milled from the Original vein from 1911 to 1934 averaged 0.454 oz. of gold, and 0.14 oz. of silver (calculated from U. S. Bureau of Mines figures) and a little copper and lead. Zinc although present was not recovered. The Original vein ore from 1935 to 1940 average 0.274 oz. of gold and 0.083 oz. of silver. There is no indication of the quality of the ore from early operations except the historical notations made earlier in this account.

Colorado Mine. Location: Near the center of sec. 27, T. 4 S., R. 18 E., M.D. on the east side of Long Canyon Creek a quarter of a mile west of Colorado School or 5 airline miles north of Mariposa. Accessible by graded dirt road via either Saxon or Sherlock Creek roads. Ownership: Property is jointly owned by Corinne Kratzer ($\frac{1}{6}$), 555 Thirty Second Ave., Richmond, California, F. E. and P. W. Judkins ($\frac{1}{3}$), 2817 San Pablo Ave., San Pablo, California, Charles and Irma St. Johns ($\frac{1}{6}$), 619 Humboldt St., Richmond and Ellen R. Weston ($\frac{1}{3}$), 443 Ninth St., Richmond. Property consists of 1 patented fractional claim of 11 acres and 2 unpatented claims.

Little of the early history of the Colorado mine has been recorded. It already had extensive workings in 1914 when the mine was being developed by P. W. Judkins, C. H. Weston and I. L. Dearborn of Mariposa. Ownership of the mine still remains with these individuals or their heirs.

The Colorado vein averages $1\frac{1}{2}$ to 2 feet wide, strikes N. 50° W. and dips 60°-80° NE. Locally it reaches a width of 7 feet. Wall rocks are chiefly slate and sandy metasediments belonging to the Paleozoic Calaveras group. The metasediments have been intruded by greenstone dikes and sills 1 foot to 3 feet wide. The strike and dip of the slaty cleavage near the shaft is roughly parallel to the vein and to the bedding planes. Vein matter is chiefly banded quartz carrying free gold and a little pyrite. According to Julihn and Horton (1940, p. 153) the ore shoots are 30 to 75 feet long and pitch north at about 45°.

Workings are reported to consist of a 200-foot inclined shaft, a 500-foot working level that intersects the shaft 125 feet from the collar, and a 200-foot drift on the 95-foot level south of the shaft (Julihn and Horton, 1940, p. 153). According to Laizure (1928, p. 83) there is a stope above the 95-foot level 120 feet long and 35 feet high and Julihn and Horton state that most of the known ore has been stoped to the surface above the 95-foot level. The workings are caved and inaccessible, and there were no buildings or equipment on the property in August 1954.

Nothing is recorded on the early production of the Colorado mine. In the late 1920's, about 2500 tons of ore was mined which ran $10 to $11 per ton with some ''development rock'' running $8 (Laizure, 1928, p. 83). Between 1915 and 1938, 7129 tons of ore was milled which yielded 2011.91 oz. of gold and 351 oz. of silver (U. S. Bureau of Mines records). The average tenor of ore was, therefore, 0.282 oz. of gold per ton or about $15.87 at the present price of gold. The total production of the mine probably does not greatly exceed $50,000.

Cotton Creek (Hauser) Mine. Location: NW ¼, sec. 24, T. 4 S., R. 16 E., M.D., on Cotton Creek ¼ mile east of the Hunter Valley road or 7½ airline miles northeast of Hornitos. Ownership: not determined. Last known operator (1939) was Cotton Creek Mining Company, W. H. Hauser, Richmond, California, manager.

In July, 1937, the Cotton Creek Mining Company began development of a hitherto little-known prospect (Julihn and Horton, 1940, p. 120). This company operated the mine until 1939 since when it has been idle except for assessment work.

The vein, which averages about 2½ feet wide, strikes N. 40° W. and dips 20-25° S. In places it reaches a width of 5 feet. Vein matter consists of quartz, auriferous pyrite, chalcopyrite, galena, and native gold. Large areas of wall-rock adjacent to the vein have been impregnated with pyrite. Wall rocks are greenstone (meta-augite andesite) of the Upper Jurassic Peñon Blanco formation.

Workings consist of a shaft inclined 20° to the S.W. and an unknown number and footage of drifts. In August 1938, the shaft was 175 feet deep with 75-foot drifts north and south from the shaft on the 100-foot level (Julihn and Horton, 1940, p. 120).

In August 1954 the mill and hoisting equipment were in good condition, but the shaft was caved just below the collar and the headframe was in need of repair. Equipment includes a hoist, compressor, jaw crushers, Straub mill, rake classifier and other miscellaneous equipment. The shaking tables and flotation cells which once were part of the mill had been removed.

Between 1937 and 1939 the mine produced 4897 tons of ore which yielded 1304 oz. of gold, 725 oz. of silver, 1669 lbs. of copper and 1730 lbs. of lead (U. S. Bureau of Mines records). According to Julihn and Horton (1940, p. 120) the ore averaged $15 per ton at the present price of gold, but by U. S. Bureau of Mines figures the yield was nearer $11 per ton.

Diltz (Diltz and Mann, W.Y.O.D.) Mine. Location: E. ½ sec. 29 T. 4 S., R. 18 E., M.D., on the east side of Sherlock Creek 5 airline miles north and slightly west of Mariposa. Accessible by good, graded dirt road via Whitlock Creek. Ownership: Diltz Mines (Allen F. Grant, Earl E. Baker et al.), c/o John P. Fulham, Mariposa, California, owns two patented claims, the Diltz and Mann and W.Y.O.D., and 6 unpatented claims (3 full and 3 fractional).

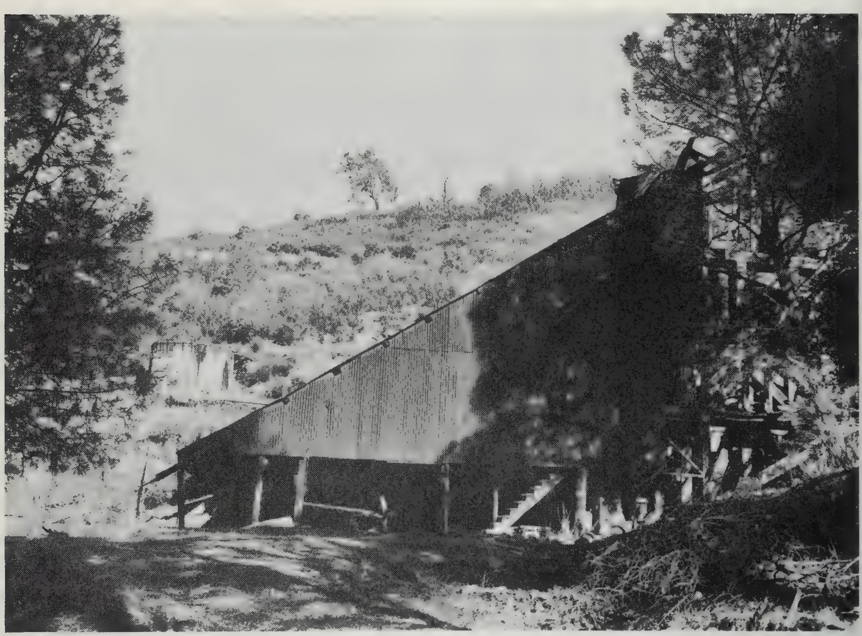

FIGURE 19. Mill building and water tank at the Diltz gold mine in the Sherlock Creek district. The Diltz mine, with a total production in excess of $750,000, is noted for its pockets of specimen ore found particularly in the feathered parts of the vein and in stringer veins. Much of the early day rich material was placered from the weathered, partly eroded vein system at or close to the surface. *Photo by Mary H. Rice.*

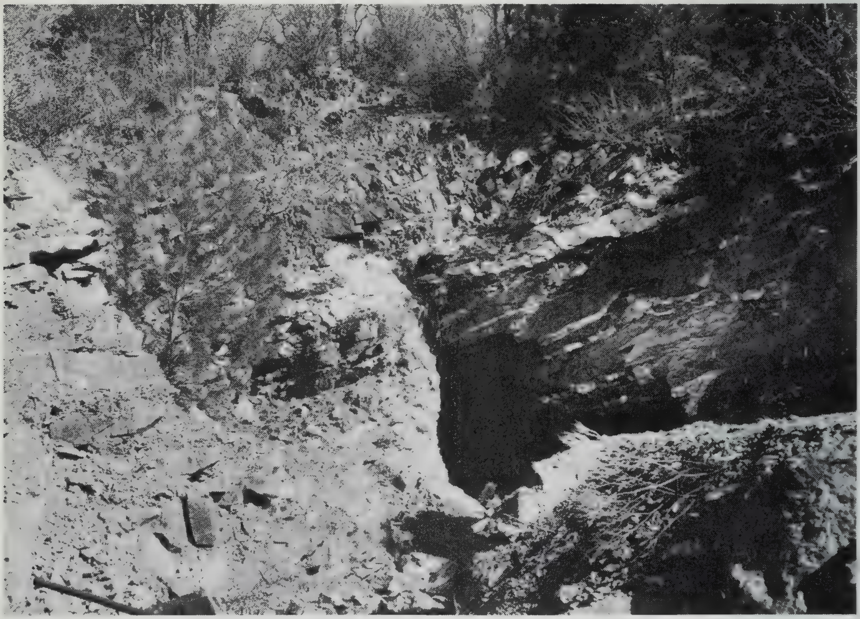

FIGURE 20. Parallel stringer veins of Diltz vein system at the portal of one of the mine adits. The vein system has a general northerly strike and a gentle east dip near the surface, but steepens somewhat at depth. *Photo by Mary H. Rice.*

The Diltz mine was discovered during the 1860s either by Tom Early or by Captain John S. Diltz. The *Mariposa Gazette* of April 10, 1886, states that Early worked the mine before Captain Diltz became owner, taking out 232 oz. of free gold by sluicing and sending 250 tons of ore to the Whitlock mill which returned $32 per ton. Captain Diltz operated the mine under very adverse circumstances from the 1870s until the time of his death in 1895, chiefly by washing the surface soil and soft, brecciated parts of the vein. In 1884 a landslide buried the Rickard shaft (the most northerly of several shallow shafts) and landslides seriously hampered operations in January, 1886. In 1886 Diltz recovered a mass of gold weighing 10 lbs. 6 oz., avoirdupois, for which he received $2000 (Min. and Sci. Press, vol. 52, no. 16, p. 260). Throughout the period of Diltz's ownership the mine was not equipped with a mill and very little ore was custom-milled elsewhere. Early in 1887 the mine was leased for a short period by Joe Shantz and Sam Jacoby and in 1890 George Stewart worked the mine for a time in partnership with Captain Diltz (Min. and Sci. Press, vol. 16, no. 13, p. 216).

After the death of Captain Diltz in 1895, the mine was held for a time as part of the Diltz estate and then was acquired by Hugh Devaney. In 1914 it was purchased from the Devaney estate by Mr. and Mrs. S. J. Harris of Jerseydale and some work was done at the mine that summer by the Mariposa Mines and Development Company, a partnership of C. A. Schlageter and T. L. Diven (Castello, W. O., 1921, p. 113). By 1919 ownership had passed to Mrs. Jenny Diven of Oakland, California. In 1927, George Ahart of Mariposa leased the mine from Mrs. Diven and installed a 10-stamp mill (Laizure, C. M., 1928, p. 85). The present owners acquired the property in 1931 and operated it during the periods 1931-42 and 1943-50. In May 1932, a mass of specimen gold weighing 52 pounds, troy, was taken from the 100-level. It yielded 43 lbs. 2 oz. of gold worth $10,707 at the old price of $20.67. Another specimen was recovered weighing 20 lbs. 2 oz. worth $3,862. Pockets containing $100 to $500 in free gold are not unusual.

The total estimated production of the Diltz mine is between $750,000 and $1,000,000. From 1924 through 1954 the mine produced 81,657 tons of ore from which 21,135 oz. of gold and 3395 oz. of silver were extracted (compiled from records of the U. S. Bureau of Mines). These figures do not include the period during which Captain Diltz operated the mine nor the specimen gold which was marketed elsewhere than the mint. Most of the recorded production was made since the price of gold was raised to $35 an ounce. The average tenor of ore milled was about 0.24 oz. per ton. The *Mariposa Gazette* of April 25, 1885, states that ore and float from the surface workings averaged $15 per ton (at the former price of gold). A later entry for December 12, 1885, indicates that the surface material averaged $14 per ton by sluicing and that the remaining uncrushed ore ran $30 per ton.

The veins at the Diltz mine cut an ancient series of pyroxene andesite greenstones of probable Paleozoic age. Both intrusive and flow-rocks as well as pyroclastic masses are represented in the series. The principal vein strikes N. 10° E. and dips 35-40° east. At depth it has an average width of about 2½ feet, but in places reaches a width of 10 feet. Near the old open workings of the mine northeast of the main shaft, the vein flattens or rolls and feathers out into the wall rocks in places becoming 15-20 feet thick. According to old accounts the vein never apexed at the surface. The greenstone of the hanging wall differs considerably in appearance from that of the footwall side which may indicate a considerable throw on the fault the vein occupies.

In addition to native gold, ore minerals include arsenopyrite, pyrite, chalcopyrite, tetrahedrite and galena. Gangue minerals include milky and ribbon quartz, calcite and oxides of iron and manganese. According to Julihn and Horton (p. 146, 1940) the chief sulfide mineral is arsenopyrite. Ore shoots have been found in the vein over a distance of more than 1400 feet of strike length. These average about 350 feet long (Laizure, 1928, p. 29).

The principal working is a 625-foot inclined underground shaft sunk from the compressor level 200 feet below the top of the vein and 300 feet from the portal. This shaft serves 6 levels aggregating 4700 feet of drifts (Julihn and Horton, 1940, p. 146). There are also several shallow inclined shafts and several tunnels at various places along the vein which are now largely caved and inaccessible. The vein is well exposed in a glory hole 300 feet north of the portal of the main tunnel. When active, the mine made about 30,000 gallons of water per day (Julihn and Horton, 1940, p. 146).

The mill is equipped with an 8″ x 20″ jaw crusher, ore bins, fifteen 1250-lb. stamps, screens, amalgamation plates, drag classifier, and dewatering cones. Eighty percent of the water is returned to the mill circuit when the mill is operating. Mine and mill have been largely idle since 1952.

Dolman (Oyler Lode, Hickman, Bear Valley Mountain) Mine. Location: SE¼, sec. 29, NW¼ sec. 33, T. 4 S., R. 17 E., M.D., 1½ miles south of Bear Valley. Ownership: Not determined; probably Ellen T. Simpson, et al.

According to Laizure (1935, p. 31), the Dolman mine was discovered in 1894. In 1902 Charles Adair and Henry Oyler leased the mine from the Mariposa Commercial and Mining Co. and a 50-foot shaft was sunk (Min. and Sci. Press, vol. 75, no. 1, p. 608). During the period of activity some ore was mined and shipped. Laizure (1935, p. 31) states that the mine ". . . produced about 800 tons of ore which had an average value of $13 per ton . . .". Official records of the Mariposa Commercial and Mining Company, however, indicate that only 59.1 tons of ore was shipped which returned $756.78 or an average of $12.80 per ton. In 1934 the property passed into the hands of a company in which R. L. and E. P. Hickman of San Francisco and Phil B. Dolman of Bear Valley were the chief active participants. During 1939 and 1940 some 393 tons of ore was shipped which yielded 24 oz. of gold and 7 oz. of silver, returning about $2.15 per ton (U. S. Bureau of Mines records). The mine has been idle since 1940.

The Oyler vein has a general strike of N. 35° W. and dips 60° southwest. This direction of dip is unusual in mines of this area which generally dip northeast. It occupies a well-defined shear zone which is traceable for 2 miles. Wall rocks are pyroxene andesite greenstones of probably Upper Jurassic age. The vein varies from a fraction of a foot to 5 feet wide. Ore shoots are short—commonly less than 30 feet

(Laizure, 1935, p. 32). Vein matter is chiefly milky quartz with pyrite, pyrrhotite, chalcopyrite, oxides of iron and native gold. About 60 percent of the gold is found in sulfide minerals.

The principal group of workings, developed mainly by Hickman and Dolman between 1934 and 1940, consist of a 265-foot inclined shaft and 1445 feet of drifts on four levels, the 100, 175, 200, and 250. The longest drift, driven 760 feet north of the shaft is on the 200-level. In this drift an ore body was encountered 625 feet from the shaft which assayed $8 per ton (Julihn and Horton, 1940, p. 129). There is a main ore shoot south of the main shaft penetrated on the 100- and 175-foot levels and two smaller ore shoots were found on the 175-foot level. Some ore in the main shoot on the 175-foot level ran $18 per ton, according to Julihn and Horton. A geologic map and sections of the mine together with some sampling data are found in Laizure (1935, p. 31).

Doss (Doss and Thorne, Ginaca, Brooks) Mine. Location: Secs. 21, 28, T. 5 S., R. 16 E., M.D., 2½ airline miles southeast of Hornitos or 2 miles northwest of Indian Gulch. Accessible by 2 miles of ungraded dirt road from the paved Hornitos-Mt. Bullion road. Ownership: Frank Trabucco Jr., Hornitos, California, owns 2 patented fractional claims, the Doss and the Thorne Extension, totaling 18.27 acres.

The Doss mine was discovered sometime prior to 1870. In 1874 the shaft was down 110 feet and averaged 10 feet wide to that depth. At that time the owner was a Mr. Brooks of Hornitos. One lot (200 tons) of ore ran $17 per ton and another of 400 tons yielded between $10 and $11 per ton (Min. and Sci. Press, vol. 29, no. 9, p. 85) plus a sulfide concentrate assaying $24 per ton. Storms (1896, p. 218) visited the mine in 1896, finding the shaft still 110 feet deep. Gold to the amount of 677.25 oz. was recovered from an unknown tonnage of ore in 1897. By 1920 ownership had passed to L. A. Ginaca and C. Ginaca of San Francisco. The shaft had been deepened to 400 feet and an adit level driven 475 feet. The 200-level had 300 feet of drifts. In 1933 the mine was under option to A. D. Hadsel and then was acquired by the Doss Mining Company of San Francisco who operated it until July, 1934. Between 1934 and 1938 it was intermittently active under several operators, but has been idle since 1938.

The vein at the Doss Mine strikes N. 40-45° E. and dips 55° southeast. Wall rocks are chiefly slaty and schistose volcanics belonging to the Upper Jurassic Amador group described by Taliaferro (1943, pp. 282-284). The vein averages 8-10 feet wide, reaching a maximum width of about 22 feet (Laizure, 1935, p. 114). Ore shoots average 250 feet long as measured along the strike and ore shoots have been discovered over a vein length of 1000 feet and to a depth of 400 feet. Vein matter consists of milky quartz with pyrite, galena, sphalerite, chalcopyrite and gold.

Workings consist of a 250-foot (vertical depth) inclined shaft, the last to be worked, and an older shaft 400 feet deep. There is also a 540-foot adit. None of these are in working condition.

The early production of the Doss Mine was not recorded other than the figures listed above. In 1929, thirty-eight tons of ore was milled which yielded 39.95 oz. of gold and 76 oz. of silver. Between 1933 and 1938, ten thousand two hundred and ninety-five tons of ore was milled which yielded 2025.39 oz. of gold and 1713 oz. of silver or an average of about $7 per ton. The total recorded production of the mine is approximately $94,400 and the estimated production is in excess of $100,000.

Duncan (Lost Douglas) Mine. Location: Secs. 16 and 21, T. 5 S., R. 16 E., M. D., just south of the Hornitos—Mt. Bullion road. Adjoins Martinez mine on the northwest. Ownership: George D. Turner, Rt. 1, Box 1049, Ceres, California, owns one patented claim of 44 acres.

The Duncan mine is a very old property dating back to before 1870. The first owner of record was Jerome B. Brown who acquired the property in 1873 or 1874 (Min. and Sci. Press, vol. 35, no. 18, p. 278). Brown operated the mine intermittently until 1895 or 1896 when ownership passed into the hands of William and George Turner of Hornitos. In addition to ore run through the mill Brown took out a $3000 pocket of specimen material in 1877 (Min. and Sci. Press, vol. 35, no. 8, p. 278) and a $1000 pocket in 1888 (Min. and Sci. Press, vol. 57, no. 24, p. 400). A 5-stamp mill was operating on the property as early as 1885 (Min. and Sci. Press, vol. 50, no. 26, p. 416). Except for a short period of activity in 1917 there is no record of activity at the Duncan mine until 1920. In March 1920, Onito and Tura took out a pocket of specimen ore yielding $1000 (Castello, 1921, p. 114). In 1926 the Duncan Mining Company was formed in which Bert Thurber and D. L. Onito were the principal active partners. Considerable ore was milled in 1927 by this company. The mine was operated under lease for a time in 1932 by Austin Davis of Hornitos, in 1933 by Chris Peterson and in 1934-35 by H. L. Berkey and his associates David Onito and J. A. Bodies (U. S. Bureau of Mines records; Laizure, 1935, p. 32). The mine has largely been idle since the late 1930's and there is no equipment on the property.

The vein system at the Duncan mine is well defined at the surface, strikes N. 50° W. and dips about 45° NE. At the surface it varies from 2 to 5 feet wide and consists chiefly of vuggy quartz and pyrite. Although several ore shoots of fair grade have been worked, the mine is noted for its pockety character and the last ore milled in the middle 1930's was of marginal grade. Wall rocks are schistose greenstone, quartz biotite schist and quartz biotite hornfels derived from volcanic tuffs and flows of the Upper Jurassic Amador group.

Workings consist of a series of open pits and caved shafts strung out along the vein for nearly half a mile. None were accessible in September 1954. The main shaft was down 325 feet along a 45° incline in 1934 (Laizure, 1935, p. 32).

Production records on the Duncan mine are too incomplete to give much indication of the total yield of the mine. In 1897-98, two hundred and forty-six oz. of gold was recovered from an unknown quantity of ore. In 1927, five hundred tons of ore yielded 219.82 oz. of gold and 70 oz. of silver (U. S. Bureau of Mines records). From 1932 to 1935, eleven hundred and forty-six tons of ore yielded 90 oz. of gold and 45 oz. of silver (U. S. Bureau of Mines records).

Early (Revel, Louisa, Felix, George Placer) Group. Location: Secs. 20, 21, T. 4 S., R. 19 E., M. D., 1½ miles northwest of Jerseydale or 7½ airline miles northeast of Mariposa. Accessible from Mariposa by about 10 miles of paved road, via Triangle Road, Darrah and Jerseydale, and

2½ miles of graded dirt road from Jerseydale. Ownership: Robin H. Jackson and Edythe E. Jackson, Box 142, Mariposa, California own a patented property of 80 acres, recorded as the George Placer mine, which includes the former Early, Louisa, Revel and Revel No. 2 lode claims. Also the Felix lode claim embracing 19.16 acres.

Recorded history of the Early mine reaches back to 1884 when Rice and Ferguson operated the property. At that time there was a shaft 100 feet deep on the Early claim and a 260-foot tunnel and 8-stamp mill on the Mt. View claim (Min. and Sci. Press, vol. 49, no. 16, p. 2488, 1884). The name Mt. View has been dropped, but it may be the same as the Revel. By 1902 ownership had passed to August and Eli Revel who operated the mine for a short time that year with A. T. Mitchell as superintendent (Eng. and Min., Jour., vol. 74, no. 10, p. 320, 1902). Between 1902 and 1916 it was active for short periods of time under various lessees. In 1916 it was leased by Mrs. C. N. McIntyre who opened the old drift (presumably on Revel claim) and sunk a 50-foot shaft from the drift level (Min. and Sci. Press, vol. 112, p. 528, 1916). After a year of inactivity operations were again started under new management in June 1917 with George H. Hook as superintendent. A 10-stamp mill was put into operation employing amalgamation, but, owing to the high percentage of sulfides in the ore, returns were not very satisfactory (Eng. and Min. Jour., vol. 104, no. 4, p. 408, 1917). Between 1917 and 1920 activity was curtailed by litigation and various groups controlled the mine for short periods. After about 12 years of inactivity, Early Gold Mining Company of Laredo, Texas reopened the mine under supervision of J. E. Rogers of Mariposa. Rogers operated the mine until 1939. In 1941, George Long of Mariposa worked the mine for a short period and in 1946, H. N. Hammond of Mariposa was operator. The present owners acquired the property in the late 1940's and have intermittently worked on the mine since that time except for a short period in 1951 when some ore was mined and shipped by H. H. Odgers and I. R. Toye of Midpines.

Two sets of east- and northeast-trending quartz veins cut hornblende quartz diorite. Most of the veins average between 2 and 3 feet wide, but widen locally to as much as 6 feet. The principal developed vein on Revel claim strikes roughly east and is vertical. The most thoroughly explored vein on the Early claim strikes N. 25° E. and dips 60° SE. Vein matter is chiefly quartz and pyrite with some chalcopyrite, argentiferous galena and light yellowish-brown native gold, but there are showings of scheelite in the vein matter and in the quartz diorite adjacent to the veins. Most of the high-grade scheelite ore is in stringers 2-4 inches wide.

The present extent of the mine workings could not be ascertained in September 1954 as all were inaccessible because of caveins and flooding. In 1914 there was a 16-foot shaft, surface trenches and 2 adits 50 and 60 feet long on the Louisa claim (Lowell, F. L., 1916, p. 586); an adit 800 feet long, overhand-stoped to a height of 150 feet, and a 40-foot crosscut-tunnel on the Early claim; and a shaft 150 feet deep with several hundred feet of drifts on the Revel claim. Considerable work was done on the claims since 1914 so the above list of workings undoubtedly is incomplete.

In September, 1954, exploration was progressing by use of bulldozer cuts which had uncovered several veins. Soil mantle is 18-20 feet deep in most places, but commonly carries considerable gold. Part of this was derived from the weathered upper portions of the vein and partly from old mill tailings. Some of the mantle material may prove rich enough to process.

Production records for the Early mine are incomplete but a total of $22,600 was recorded between 1909 and 1952. From 1909-1914, 478 tons of ore were mined which yielded 251.02 oz. of gold and 50 oz. of silver. From 1917 to 1920 a total of 697 tons of ore mined yielded 259.34 oz. of gold and 364 oz. of silver. For the period 1932-33, seven hundred tons of ore was processed which yielded 264.47 oz. of gold and 147 oz. of silver. Between 1934 and 1946 six hundred and fifty tons of ore yielded 156.34 oz. of gold, 207 oz. of silver and 1231 pounds of copper (U. S. Bureau of Mines records).

Feliciana Mine. Location: Secs. 12, 13, T. 4 S., R. 18 E., secs. 7, 18, T. 4 S., R. 19 E., M.D. Accessible by way of State Highway 140 and 2½ miles of the graded dirt road up Trabucco Creek. Trabucco Creek road joins Highway 140 three miles north of Midpines. Ownership: Gold Ledge Mining Company, c/o Walter Gleeson, Pacific National Bank Building, San Francisco, California owns one patented claim, the Feliciana (20 acres) and 13 unpatented claims.

The Feliciana mine was discovered in the 1850s and was operated by Mexicans during the 1850s and early 1860s. In 1866 the mine was equipped with a 5-stamp mill and had a shaft 190 feet deep. Louis Trabucco of Bear Valley owned and operated the mill and had a part interest in the mine (Min. and Sci. Press, vol. 13, no. 8, p. 118, 1866). In the summer of 1866 fire destroyed the mill and later that year the mine was purchased by a San Francisco Company (Min. and Sci. Press, vol. 23, no. 18, p. 276). In December 1871 the mine was leased by J. Dolan of Bear Valley and reconstruction of the mill was started. By 1875 a 10-stamp mill had been built, a 300-foot tunnel driven and a 300-foot shaft sunk. In 1896 the mine was sold to E. S. Davis of Fresno. By 1914, ownership had passed to J. B. Campbell of Fresno (Lowell, 1916, p. 582). Thomas Doyle leased the mine from Campbell in 1917, after a long period of inactivity, but this activity was short lived, the mine having become idle by 1920 and ownership having passed to Mrs. Campbell. In 1925, the Feliciana Gold Mining Company, Inc. was organized with M. Farber as president and Pauline Farber as vice president, both of San Francisco (Laizure, 1928, p. 86). This company operated several other mines in the Briceburg district during the late 1920s, but had largely ceased operations by 1930. About 1931 the mine was acquired by the present owners and in 1933 the Gold Ledge Company began driving a long tunnel designed to intersect the vein at a depth of 900 feet. By September 1934 this tunnel had reached a length of 1186 feet but work on it was carried little further and was discontinued late in 1934 (Laizure, 1935, p. 33). In 1941 the mine was leased by Russell J. Wilson with William Bessler as mine superintendent. For a time ore was milled at the Buffalo mine, but in 1942 a mill was moved to the Feliciana from the Black Oak mine in El Dorado County (Eng. and Min. Jour., vol. 142, no. 10, p. 76, 1942). Closed down by War Production Board Order L-208, the mine has been idle since 1943 except for maintenance and assessment work.

The total recorded production of the Feliciana mine is approximately $159,500, chiefly in gold and silver but also from a little lead and copper. Between 1924 and 1934 a total of 3231 tons of ore yielded 2412.7 oz. of gold or an average of 0.74 oz. per ton. From 1941 to 1943 a total of 4428 tons of ore yielded 2873.1 oz. of gold and 465 oz. of silver or an average of about 0.65 oz. of gold per ton.

Well-defined and traceable for several thousand feet at the surface, the Feliciana vein averages between 2½ and 3½ feet wide, strikes N. 35-40° W. and dips 70-75° SW. It is exposd on rugged topography through a vertical distance of nearly 1000 feet. Vein matter consists of native gold, galena and chalcopyrite in a gangue of quartz and pyrite. A steeply dipping secondary vein intersects the main vein at an angle of 20° and the principal ore shoot has developed along this intersection (Laizure, 1928, p. 86). Two minor veins also join the main vein from the east or footwall side. These are largely unexplored.

Wall rocks are a series of northwest-trending, steeply tilted metasediments belonging to the Paleozoic Calaveras group. Slate, phyllite and graphitic and hornfelsic slates and schists are the principal rock types. The metamorphic series is cut by several small quartz diorite dikes.

Principal workings on the Feliciana claim are a 340-foot crosscut adit, with several hundred feet of drifts both north and south of the adit, and a shaft at least 190 feet deep. A winze from the crosscut adit connects with a lower level and drifts. The authors have no information on the extent of these workings. In August 1954, the adit could be entered for at least 100 feet and readily could be cleaned out beyond that point. The shaft was caved and the access road in poor condition. A 700-foot tunnel mentioned by Castello (1921, p. 115) could not be located and is presumed to be caved. This was reported to have several hundred feet of drifts. Most of the late work done on the mine has been from the lower tunnel on the Ace-in-the-Hole claim, the one driven in 1933-34. This is driven at an elevation of 3100 feet or 550 feet below the adit on the Feliciana claim. It is 1400 feet long and is connected with the older workings by an 80-foot raise. A second raise from the adit contacts the vein but is not connected with the upper workings.

French Mine. Location: Secs. 9, 16, T. 4S., R. 17E., M.D., half a mile south of the Merced River and 1 mile east of the Pine Tree mine. Accessible by way of State Highway 49 and 1¼ miles of dirt road leading east from the water tanks of the Pine Tree and Josephine mill. Ownership: Pacific Mining Company, Crocker Building, San Francisco, California, owns 3420 acres which includes the French, French Pocket and Evans mines.

The French mine is a very old property active in the earliest days of mining in the county. Throughout most of its history the mine was held by the Mariposa Commercial and Mining Company and its predecessors and worked intermittently by various lessees. In 1897 the claims were jumped by a group headed by Bert McFadden and Robert Barnett because, through inaccurate surveys, they believed the land to be outside of Las Mariposas Grant (Min. and Sci. Press, vol. 75, no. 4, p. 80, 1897). The French mine and several others in the vicinity were acquired by the Pacific Mining Company in the early 1930s. Charles Sommers, et al., operated the French mine under lease in the middle 1930s. The last work done at the mine was in 1948.

The total recorded production of the French mine since 1903 is about $116,750. The early production may have been several times this amount. Ore taken out in 1903 averaged $44.16 per ton; in 1924 the average was $16.53 and in 1935-48 the yield was $13.99 per ton.

Two roughly parallel quartz veins cross the property. The principal vein averages about 20 inches wide, strikes N. 70° E. and dips 30° S. (Laizure, 1935, p. 33). Wall rocks are meta-pyroxene andesite greenstone of unknown age and slaty metasediments belonging to the Paleozoic Calaveras group. The principal working is a crosscut adit 155 feet long with drifts on the main level totaling 660 feet. Ore has been stoped almost continuously above the main level and there are seven stope-openings connecting with the surface. Two inclined shafts, each about 150 feet deep, connect with the main level. These are spaced about 50 feet apart. Both are in need of cleaning out. They connect with a lower level about 100 feet long driven about 38 feet below the main level. The total footage of workings aggregates 1048 feet.

Garibaldi (Blue Lead) Mine. Location: Secs. 4, 9, T. 3 S., R. 18 E., M.D., 1 mile west of U.S. Forest Service Kinsey guard station. Kinsey guard station is 12 miles from Briceburg on State Highway 140 by good graded dirt road. Ownership: Robert O. Greeves, Box 151, Columbia, California, owns one patented claim of 18.8 acres.

The Garibaldi mine is an old property dating back prior to 1897. Development of the mine has been hampered by water as the mine yields up to 600,000 gallons of water a day. Little has been recorded of the early history of the property. The principal period of activity was 1897-1902 when Garibaldi Mining Company operated the mine with S. R. Porter as superintendent. During this period a 325-foot inclined shaft was sunk parallel to the dip of the vein, a 40-foot crosscut to the vein was run and an unknown footage of drifts run on the vein from the end of the crosscut. Crosscut and drifts were run from the 300-level. Two 650-gallon capacity skips were kept running day and night to keep the mine unwatered. The Garibaldi Company operated a 5-stamp mill and a Huntington mill, processing 30 to 40 tons of ore daily (Min. and Sci. Press, vol. 84, no. 1, p. 11; vol. 84, no. 3, p. 39; vol. 72, no. 16, p. 503). Early in 1902, forty to sixty ounces of amalgam was being removed from the plates at the end of every shift, presumably from 10 to 15 tons of ore milled. This operation ended in March 1902 because of the expense and the technical difficulties experienced in handling the mine water (Min. and Sci. Press, vol. 73, no. 20, p. 704, 1902). In 1938 the mine was leased for a short time by Walter D. McLean of Coulterville. The tailings dump was worked under lease for a short period in the late 1930s by John P. McCormick of Sonora (Julihn and Horton, 1940, p. 136), but the mine has been idle since that time.

According to Julihn and Horton (1940, p. 135), the Garibaldi vein strikes a little north of east and dips 45° E. Early notes in the *Mining and Scientific Press* mention two parallel veins 1 to 15 feet apart separated by altered dike rock. Neither vein was exposed at the time of the authors' visit in August 1954. The veins follow close to the contact between dolomite and a series of schistose metasediments probably belonging to the Paleozoic Calaveras group. The principal rock types in the metasedimentary series are slate, graphitic schist, and black manganiferous chert. The dolomite, which occurs chiefly on the hanging wall side of the vein is blue-gray-to-black and somewhat platy. Most of the high-grade ore occurs as boulder-like to nodular masses in a black gouge found between dolomite and the altered dike rock. The black gouge zone, in many places simply a blue mud, is 8 to 10 feet thick. Much of the trouble with water came from cavernous dolomite on the hanging wall side of the vein, but a pump handling 500 g.p.m. will keep the mine dry.

Early work on the mine was done from two shafts of unknown depth and numerous open cuts. Work done on the mine from 1900 to 1902 has already been described. One of the shafts, probably one sunk prior to 1900 was open to a depth of about 100 feet in August 1954. Other workings were caved.

Geary (Geare) Mine. Location: SE¼, sec. 30, T. 4 S., R. 18 E., M.D. Adjoins the Nutmeg mine on the south and is about a quarter of a mile west of the Golden Gate and Coronado claims of the Golden Key group. Accessible via the graded Whitlock Creek-Sherlock Creek road from State Highway 49, a distance of 5½ miles by road from Mariposa. Ownership: Permit Mining Company, 1063 Howard St., San Francisco, California, owns one patented claim of 20 acres.

Little has been recorded concerning the early history of the Geary mine. It apparently was first worked by a series of open cuts from the surface as there are several hundred feet of almost continuous shallow workings. The property was purchased in 1898 by Terrill and Schroeder who sank a 100-foot inclined shaft, ran several hundred feet of drifts, and erected a small stamp mill (Min. and Sci. Press., vol. 76, no. 4, p. 86; vol. 76, no. 20, p. 517, 1898). The mill had a capacity of 14 tons in 24 hours. The amount and tenor of the ore mined at this time has not been recorded. In 1904 the mine was managed by James Peck of San Francisco and by 1914 ownership had passed to a Mrs. Potter. From 1918 to 1938 the owner was listed as J. S. Potter of San Francisco. It was explored during 1938 by two lessees, H. L. Womacks of Springdale, California, and Charles E. Farson of Mariposa. Under these operators a small tonnage of ore was shipped which yielded 0.38 oz. of gold and about 0.1 oz. of silver per ton. Little has been done on the mine since 1938.

The Geary vein, the same one that crosses the Nutmeg mine, is 3 to 4 feet wide, strikes N. 20° W. and dips 80° NE. From the disposition of the workings there apparently are several cutter veins crossing and at least one minor vein paralleling the main vein. Wall rocks are sheared, somewhat platy pyroxene andesite greenstones of unknown age.

According to Julihn and Horton (1940, p. 152) the main ore shoot was developed by two shafts 160 and 70 feet deep, respectively, these being about 300 feet apart. The California State Mining Bureau Mines Register for 1904 lists one shaft 100 feet deep and 300 feet of drifts. In 1954, one partly caved shaft surmounted by a wooden head frame could be identified. This apparently is the shallower of the two mentioned by Julihn and Horton. No equipment was on the property and there was no evidence of recent activity at the mine.

Gold Bug Mine. Location: Secs. 28, 33, T. 3 S., R. 17 E., M.D., in Solomon Gulch 1 mile west of the Black Bart mine. Accessible by dirt road from Date Flat on the Coulterville-Kinsey road via Dogtown and Buckhorn Peak. Ownership: N. D. Madden and K. I. Goulder, c/o Bay Construction Company, Ltd., Shelly Building, Vancouver, British Columbia, own several unpatented claims.

The Gold Bug mine produced several thousand dollars worth of gold from near-surface pockets in the 1880s and 1890s during the height of mining activity in the Cat Town district. It was operated for a short time in 1908 by Fred Shaw of Kinsey, in the late 1930s by N. D. Madden and in 1940 under lease by S. S. Escobar. One ore shoot mined between 1937 and 1940 contained 225 tons of ore which ran slightly more than 3.5 oz. of gold and 0.75 oz. of silver per ton.

The vein roughly follows the contact between slate of the Paleozoic Calaveras group, which forms the hanging wall side of the vein, and massive greenstones of unknown age. The vein, which varies from a few inches to several feet wide, is accompanied in places by albitite and diorite dikes, similar to other mines in the Cat Town and Flyaway Gulch district. According to Julihn and Horton (1940, p. 142) the high-grade pockets tend to occur when the vein is entirely in slate and where there is abundant calcite.

A 200-foot adit driven on the vein is the principal working. It penetrates the vein to a vertical depth of 70 feet. The ore shoot mined was 40 to 50 feet long, measured in the direction of strike of the vein, and 110 feet deep on the dip of the vein. In this shoot the ore averaged more than $115 per ton (Julihn and Horton, 1940, p. 142).

Gold King (Martin-Walling, Sunshine) Mine. Location: Sec. 11, T. 3 S., R. 17 E., M. D., in the Gentry Gulch district on the ridge crest half a mile southwest of the Hasloe mine. Ownership: Russell G. Rowe, Rt. 7, Box 1499, Modesto, California holds several claims adjoining the Lovely Rodgers mine on the southeast.

The Gold King mine was discovered in the 1860s and was known throughout its early history as the Martin-Walling or Martin and Walling mine. Through the first few years of operation it was reported to be fabulously rich. It was purchased in 1878 after some years of idleness by Douglass and Stevenson who developed two ore shoots and took out some ore. In 1879 it was reported sold by Joshua Hendy to eastern people along with the Bondurant for $80,000 (Min. and Sci. Press, vol. 39, no. 1, p. 5). By 1880 ownership had passed to P. P. Mast who rehabilitated the 300-foot shaft and did considerable mining results of which have not been recorded. Some exploration and rehabilitation work was done on the mine under the name Gold King during the 1930's through an adit and raise below the old workings, but no recent work has been done on it.

Two veins cross the property. The principal vein on which the main shaft is sunk strikes roughly north and dips 36° east at the surface. Poorly exposed at the surface, the vein appears to range from 2 to 4 feet wide. Vein matter is quartz with free gold, pyrite and tetrahedrite. The second vein strikes more nearly to the northwest, dips 60-70° northeast and is separated from the main vein by about 200 feet of slate and quartz-mica-graphite phyllite and schist. Vein matter is chiefly fractured quartz and fractured wall rocks.

The main vein has been developed by an inclined shaft, sunk on the vein, over 300 feet deep having 2 levels. The shaft is equipped with hoisting equipment and track but the mine is watered and partly caved 20 or 30 feet below the collar. No recent work has been done on it. The west vein has been superficially developed by shallow shafts.

Golden Key (Austin) Group. Location: Secs. 29, 32, T. 4 S., R. 18 E., M.D., on Whitlock Creek 5 airline miles northwest of Mariposa. Accessible from State Highway 49 by 5 miles of graded dirt road by way of Whitlock and Sherlock Creeks.

Ownership: Golden Key Mining Company, c/o J. E. MacDonald, Box 105D, Gilroy, California owns 6 patented claims, the Coronado No. 2, Dusenberry, Golden Gate, Hayseed, Haywire Fraction and Regan, and 3 mill sites.

Mining activity on the Golden Key claims dates back at least as far as the 1880s. In the late 1880s and early 1890s the Hayseed mine and the nearby Triumph and Farmers Hope (Miners Hope) mines were being operated by J. B. Helm and Son and considerable specimen ore was reported mined in 1890. In 1896 the Hayseed and Triumph claims were sold by the Helms to Angus McIntosh for $10,000 (Min. and Sci. Press, vol. 62, no. 9, p. 204, 1896). About the same time H. C. Austin of Fresno was operating the Regan mine from an 80-foot shaft (Storms, 1896, p. 222). By 1902 ownership of the Austin group of claims passed to T. R. Lombard, Coronado, California, and A. M. Kitchen of Chicago, and D. A. Connolly of San Francisco was named superintendent (Min. and Sci. Press, vol. 85, no. 5, p. 64, 1902). In 1903 the Austin Group Mining and Milling Company was organized with H. C. Austin as the principal owner and W. H. Cavin as general manager. This company intermittently operated various of the claims for more than 12 years. William Dolph operated the Hayseed and Miners Hope claims for a time in 1903 (Min. and Sci. Press, vol. 75, pp. 796, 944, 1903). Acquired by the Golden Key Mining Company during the early 1920's the mine was intermittently operated by them until 1949. The properties have been idle since 1949.

Two principal veins, the Regan and Hayseed, strike roughly north and dip east, the Hayseed at 40° and the Regan at 65°. These crop out about 50 feet apart and their surface courses are roughly parallel. The Regan vein is believed to be the extension of the Miners Hope vein and the Hayseed an extension of the Spread Eagle vein (Julihn and Horton, 1940, p. 151). These veins are intersected approximately at right angles by four lesser veins, the Golden Gate Nos. 1, 2 and 3 and the Coronado No. 2. The cutter veins dip south at angles between 35° and 40°. Much of the specimen ore taken from the mine has come from the cutter veins but several good sized ore shoots have been developed in the main veins. Wall rocks throughout the claims are meta-andesite greenstone of unknown age.

According to Julihn and Horton (1940, p. 151) the Golden Key group of claims had yielded $130,000 up to 1938 through a mined depth of only 135 feet. Total recorded production to 1949 is estimated at more than $154,000, but the production figures are difficult to check because of the many different names under which production was reported. The amount of gold produced before 1884 was not recorded. Ore produced between 1933 and 1949 apparently averaged about $12 per ton. The highest grade ore from sustained mining was recorded in 1912-13 when 343 tons of ore yielded 600.33 oz. of gold and 39 oz. of silver (U. S. Bureau of Mines records).

The principal workings on the Golden Key property are a long crosscut adit called the Greenstone tunnel and the inclined Hayseed shaft serving four levels. The Greenstone tunnel, more than 700 feet long, was driven to intersect the cutter veins and ultimately to connect with the workings from the Hayseed shaft. Its portal is close to the Sherlock Creek road and it is driven approximately S. 80° W. across the Golden Gate and Coronado claims. There are considerable drift and slope workings from this tunnel. The Hayseed shaft, sunk on the Hayseed claim and vein, has levels at vertical depths of 110, 220, 250 and 300 feet. More than 650 feet of drifts have been run from these levels, mostly north of the shaft. On the 300-level south of the shaft was an ore shoot 73 feet long and 5 feet wide in which ore averaged $10-$12 per ton (Julihn and Horton, 1940, p. 151).

Near the south end of the Regan claim is a partly caved shaft reported to be 310 feet deep. About 360 feet north of this shaft is the Arndke shaft 80 feet deep, also caved, and there are two other caved shafts on the Regan vein believed to be 190 and 110 feet deep, respectively (Julihn and Horton, 1940, p. 151). The Greenstone tunnel was the only working accessible to the authors in August 1954.

Granite King and Live Oak (Buckeye, Billings) Mine. Location: SW¼ sec. 3 and NW¼ sec. 10, T. 6 S., R. 18 E., M.D., 3 miles southwest of Mormon Bar and ¾ of a mile south of the old Yosemite Highway through Mormon Bar. Ownership: Edith McElligott, 1404 Poplar Ave., Fresno, California, owns a patented property of 16 acres, parts of the old Granite King and Live Oak claims.

The history of the Buckeye and Live Oak mine dates back beyond 1870. In 1871 rich ore from the upper, oxidized part of the vein was being mined by a man named Hambleton (Min. and Sci. Press, vol. 23, no. 16, p. 244, 1871). By 1902 ownership of the mine had passed to the Krogh Manufacturing Company of San Francisco who sold the property late that year to McCrae and Herman. (Min. and Sci. Press, vol. 84, no. 14, p. 194, 1902). The Buckeye mine appears on the list of mines of the Mariposa Commercial and Mining Company and apparently was acquired by that company early in the 1900s. In 1909 the mine was leased by John Hamm, C. P. Pratt and J. W. Pratt (Min. and Sci. Press, vol. 92, no. 22, p. 732, 1904). These operators produced 22 tons of ore which yielded $174.52 or an average of $7.93 per ton at the old price of gold (Logan, 1935, p. 188). By 1928 ownership had passed to O. S. Evans of Hornitos (Laizure, 1928, p. 129) but little or no mining was done in the 1920s. In 1938 the mine was reopened a partnership of M. T. McElligott, Guy Noble and Howard Campbell who operated the mine until 1941. During this period 9017 tons of ore was milled which yielded 2295 oz. of gold and 916 oz. of silver or an average of 0.243 oz. of gold per ton. The mine has been idle since 1941.

The main vein in the Granite King mine is 2 to 5 feet wide, strikes N. 40° E. and dips 35° to 50° southeast. Wall rocks are coarse-grained

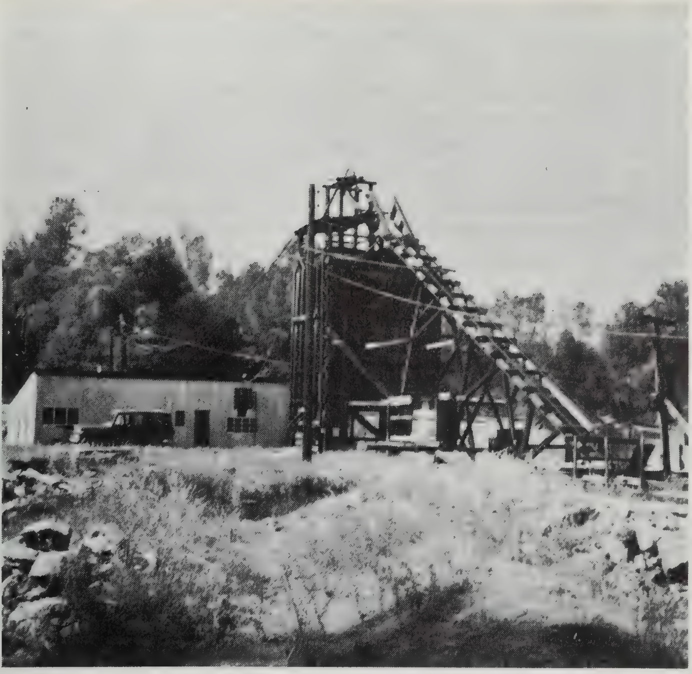

FIGURE 21. Headframe, ore bin, and shop-building at the Granite King and Live Oak mine in the Buckeye district 3 miles southwest of Mormon Bar. Lying close to the south boundary of Las Mariposas grant, the mine was managed for a time by Mariposa Commercial and Mining Company. Although not among the leading producers in the county the mine has a substantial production of ore, chiefly of sulfide type.

hornblende-biotite granodiorite and a finer-grained granitic dike rock containing a greater proportion of dark minerals than the granodiorite. According to Julihn and Horton (1940, p. 134), the dike intrudes the vein fissure and in places has been brecciated and mingled with vein matter. Ore minerals are native gold, auriferous pyrite, galena and sphalerite in a milky quartz and brecciated wall-rock gangue. Milling ore apparently averaged from 0.2 to 0.3 oz. of gold per ton with occasional pockets of higher grade ore.

The principal workings are an inclined shaft at least 80 feet deep and several hundred feet of drifts. Several vertical shafts in the vicinity of the mill are flooded and of unknown depth. The main shaft is equipped with a serviceable headframe, ore bins, hoist, skips and track. It was flooded within 30 feet of the collar in September 1954 and there was some caving below the collar.

The partly dismantled mill consists of a 16-inch jaw crusher, 4 stamps, amalgamating plates, a small ball mill and concentrating tables. Repair shops and blacksmith shops are in good condition.

Greens Gulch and Greens Gulch Extension. Location: Secs. 12, 13, T. 5 S., R. 17 E., M.D., on south side of the Mt. Bullion-Hornitos Road three-fourths of a mile west of Mt. Bullion. Accessible by paved road via Highway 49 and Greens Gulch. Ownership: Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa, California, owns the remaining parts of the Las Mariposas Grant which was largely liquidated in the early 1950s.

The Greens Gulch mine was well known through the early history of Las Mariposas Grant and was probably discovered during the 1850s. The principal periods of activity were in the 1860s and from 1901 to 1914. In the fall of 1941 the Green's Gulch mine, along with the Mt. Ophir, Princeton, Louis Mt. View and Ortega, were optioned by J. K. Wadley of Texarkana, Arkansas, and some exploration was done under the direction of Charles Greenamayer. No work has been done on the mine since 1941.

A typical Mother Lode mine, the Greens Gulch workings are on a broad vein striking N. 50-55° W. and dipping steeply east. The main vein is intersected by a northeast-trending cutter vein and much of the ore apparently was at the intersection of these veins. The vein matter is principally milky quartz containing native gold and auriferous pyrite. It locally contains quartz-ankerite-mariposite rock. The Mother Lode in this area consists of a series of northwest-trending, en echelon veins, rather than a single lode. The Greens Gulch vein is probably an extension of the main vein at the Princeton mine. Wall rocks are slate of the Upper Jurassic Mariposa formation.

Workings were caved and inaccessible in August 1954 but there is a line of stopes, several shafts and tunnels. There must be extensive drifts from the size of the dumps and the quantity of ore mined in the early 1900s.

Mariposa Commercial and Mining Company records (1900-1915) show that the Greens Gulch mine produced 10,625 tons of ore which yielded $119,140.70 or an average value of $10.25 per ton at the former price of gold. During the same period the Greens Gulch Extension produced 10.25 tons of ore from which $313.99 was realized, or an average of $13.96 per ton. These figures indicate an average tenor of ore in excess of half an ounce of gold per ton.

Hasloe (Funk, Coward, Hasloe and Centuary, Gentry Gulch) Mine. Location: Secs. 1, 2, T. 3 S., R. 17 E., M.D., in Gentry Gulch 5½ airline miles southeast of Greeley Hill and 8 airline miles east of Coulterville. Accessible by good dirt road from the surfaced Coulterville-Greeley Hill road by way of Date Flat and Gentry Gulch. Ownership: Walter D. McLean, Joseph Dupret, Jr., Ralph J. Jacobs and R. S. Hudgson, c/o Walter D. McLean, Coulterville, California, own two patented claims of 41.12 acres and two unpatented claims.

The Hasloe mine was first located by Thomas Palmer in 1857 and purchased that year by Samuel Funk. Samuel Funk was killed in a mill accident about 1860. From 1860 to 1869 the property was successfully worked by H. G. Coward who completed the 5-stamp mill started by Funk and increased it to 10 stamps. Then known as the Coward mine, the ore consistently averaged $40 per ton and considerable specimen ore was taken out (Browne, 1868, p. 32; Min. and Sci. Press, vol. 26, no. 24, p. 373, 1823). In the fall of 1873 the mine was sold by Coward to the Hasloe Mining Company and Robert Hannigan was made superintendent (Min. and Sci. Press, vol. 26, no. 16, p. 245, 1873). This company operated the mine until 1875 or 1876, finding several

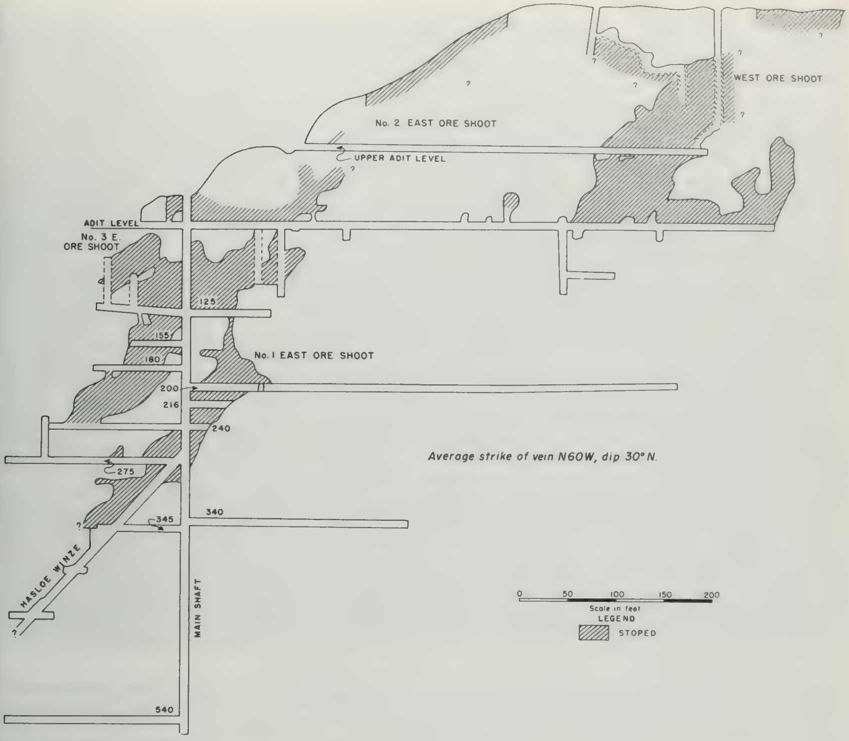
WEST ORE SHOOT
No. 2 EAST ORE SHOOT
UPPER ADIT LEVEL
ADIT LEVEL
No. 3 E. ORE SHOOT
125
155
180
No. 1 EAST ORE SHOOT
200
216
240
275
345
340
HASLOE WINZE
MAIN SHAFT
540
Average strike of vein N60W, dip 30° N.
0 50 100 150 200
Scale in feet
LEGEND
STOPED

FIGURE 22. Section in the plane of the Hasloe vein showing disposition of the workings and positions of the principal ore shoots. The mine had a production of about $3,000,000. *Drawing courtesy of Walter McLean, Coulterville.*

high-grade ore shoots. Some work was done on the property late in 1877 and in 1878. The *Mariposa Gazette,* March 22, 1879 states that the Hasloe had produced $800,000 to a depth of 300 feet. J. S. Morgan and Sons took over the property about 1880 and operated the mine until 1890. The mine is supposed to have produced over $3,000,000 under this management. After 5 years of inactivity the Hasloe was reopened and during 1895 and 1896 produced 435.38 oz. of gold from an unknown tonnage of ore. After a short period of inactivity an unsuccessful attempt was made to reopen the mine in 1898. In 1909, or 1910 a company headed by H. P. Dalton of Alameda acquired the property and it was operated by Hal G. Kennedy, Dalton's brother-in-law, until August 1911. A small tonnage of ore running 0.7 of an oz. of gold was produced during this period. Gentry Gulch Consolidated Mines Company had control of the Hasloe, Bandarita, Star and Texas Hill mines in the late 1920s (Laizure, 1928, p. 88). The present owners acquired the property in 1935 and operated it for two periods 1935-39 and 1942-48. It has been idle since 1948 and the workings below the adit level are flooded, but the present owners were preparing to reopen the mine in the summer of 1956.

Production of the Hasloe mine up to November 1, 1873 was reported in the *Mining and Scientific Press* (vol. 27, no. 20, p. 309) to be $200,000, but a previous issue of the *Mariposa Gazette* places the production at $600,000 up to 1866. No records are available for the period 1874 to 1910 but there was a substantial production of high-grade ore in 1874-75-76. According to U. S. Bureau of Mines records 3284 tons of ore was taken from the mine between 1910 and 1948 from which 1703.68 oz. of gold and 232 oz. of silver were extracted, or slightly more than $30,000.

The Hasloe vein averages about 30 inches wide but locally is as narrow as 6 inches and as wide as 5 feet. At the surface the vein strikes N. 50° W., and does not deviate more than 5° over a distance of 850 feet. It dips 28-30° northeast. Vein matter is milky quartz mingled with wall-rock gouge and in places ribboned by parallel inclusions of slate. Ore minerals are native gold, tetrahedrite and a little galena and arsenopyrite. Tetrahedrite is commonly associated with concentrations of gold and is believed to be an indicator of good ore. According to Browne (1868, p. 32) two ore shoots were developed during the early years of mining. These were about 100 feet long, pitched 40° east and were worked to a depth of 170 feet. Ore shoots have averaged 0.5 and 0.6 oz. of gold per ton but occasional pockets of specimen ores were found. Most of the gold occurs near the border of the vein, particularly on the footwall side (Julihn and Horton, 1940, p. 139). Wall rocks are principally slate and hornfelsic quartz-biotite rock derived from shale and siltstone. A diorite dike has been intruded for 200 feet along the vein fissure in the vicinity of the west ore shoot (Julihn and Horton, 1940, p. 139).

Principal workings on the Hasloe claim are a 500-foot inclined shaft and a 700-foot drift adit. Most of the ore above the adit level has been stoped. From the shaft there are 1750 feet of drifts on 6 levels. The disposition of the workings may be seen in the accompanying diagram.

Hite (Hite and Wynant, Hites Cove, Arkell) Mine. Location: Secs. 22, 26, 27, T. 3 S., R. 19 E., M.D., on the South Fork of the Merced River 1 airline mile south of Incline. Accessible by trail from Incline and from Jerseydale. A road was being constructed to the mine from Incline in 1954. Ownership: Cyrus Bell, 160 South Fairfax Ave., Los Angeles 36, California, owns the patented Priest and Coleman, Hite, Giltner, McConley, Old Dominion and Summit claims and several mill sites.

The Hite mine has been one of the most colorful and most productive gold mines in Mariposa County, and the authors have attempted to trace its history through old files of the *Engineering and Mining Journal* and *Mining and Scientific Press*. It was discovered in 1862 by John R. Hite and made Hite a relatively rich man in the 17-year period during which it was operated by Hite and Company. Development of the mine was entirely by hand-methods, and arrastra milling. Hite was able to get a small stamp-mill driven by water power into operation by 1866 and the capacity of the mill was doubled by 1868. The mine was surveyed for patent in 1866. During the 17-year period of operation by Hite and Company, Hite was the principal director of operations although Peter Wynant was a partner with Hite for a short period in the early 1860's. Under Hite's management, 2 long crosscut adits were driven to the vein. The upper adit intersected the vein between 200 and 250 feet from the surface. The lower adit intersected the vein at

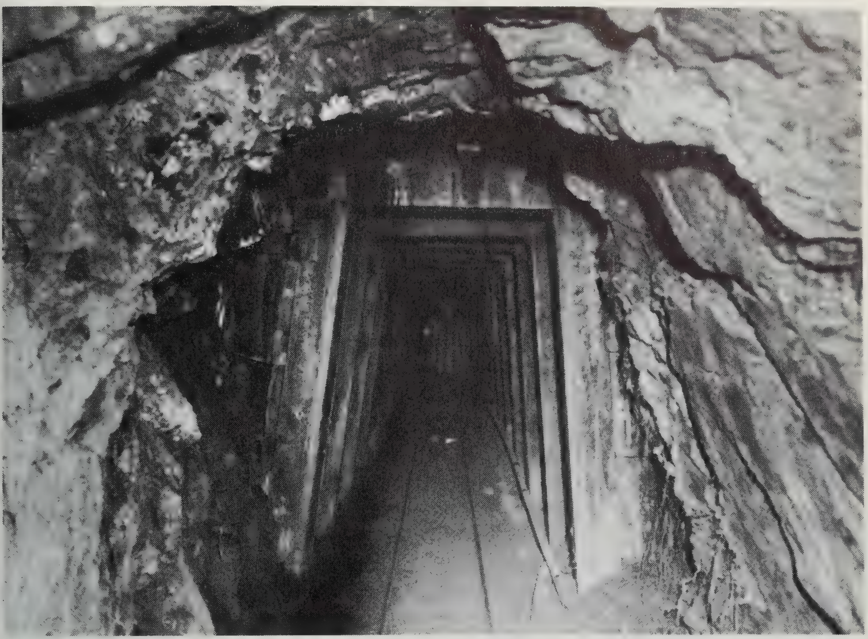

FIGURE 23. Adit of the Horseshoe mine in the Bull Creek district 10 airline miles northeast of Coulterville. One of but few mines recently operated in Mariposa County the small, high-grade shoots of ore have yielded nearly $14,000 during recent development work. *Photo by Mary H. Rice.*

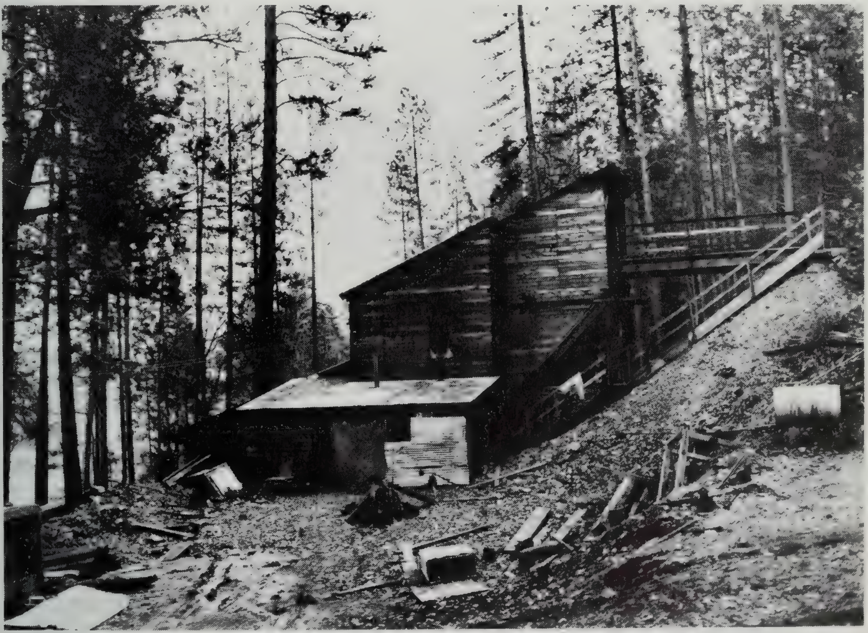

FIGURE 24. Mill building at the Horseshoe mine. *Photo by Mary H. Rice.*

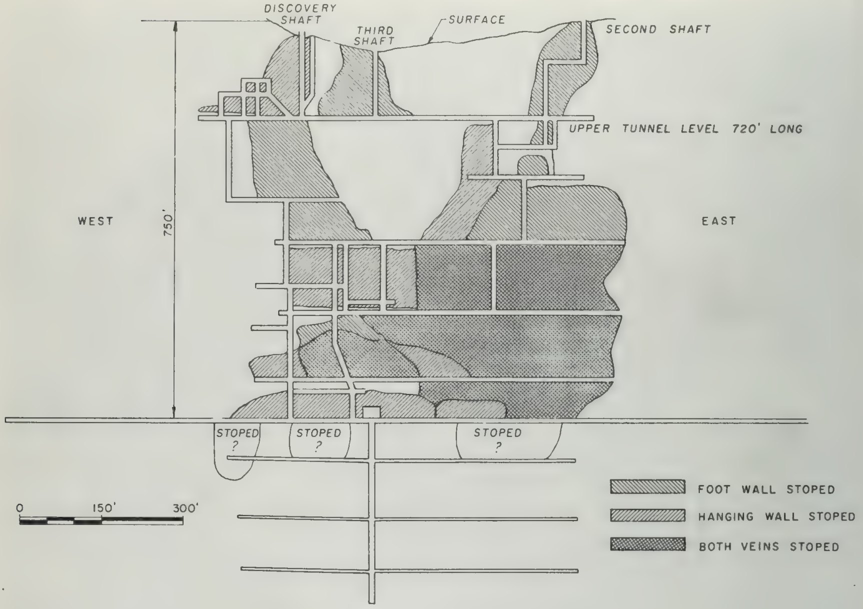

FIGURE 25. Longitudinal projection of the workings of the Hite gold mine drawn in the plane of the vein. Located in the Hite district close to the South Fork of the Merced River, the Hite mine has produced at least $3,000,000—mostly prior to 1900. Two long crosscut adits trending toward the observer connect the lateral workings to the surface. The lower crosscut was the main means of entry during the later years of operation. *Diagram reproduced through courtesy of Francis H. Frederick.*

a vertical depth of between 700 and 800 feet or an inclined depth of over 900 feet. During the last few years of operations by Hite and Company a winze or underground shaft was sunk from the end of the lower adit to a depth of 330 feet and three drift levels were run from this working.

In August 1879 the mine was sold by Hite for between $600,000 and $650,000 to a corporation headed by W. S. Clark and J. R. Bothwell, Hite remaining as a trustee in the new corporation. Considerable mining and development was done by the company, particularly on workings from the winze. Operation of the mine by this group ended in 1882 with a dispute and prolonged litigation. The litigation was not settled until 1887. During that year the mine was reopened under management of Judge Walker but the operation was short lived. In 1883 the mine was managed for a short time by the McCaw brothers. In 1895, W. S. Chapman and associates organized the Hite Gold Mining Company and the property was bonded to them for $100,000. This venture also ended in litigation after minor production. A. H. Ward and H. H. Todd purchased the Hite mine in 1899 for $46,000 and organized the Hite Cove Gold Mining Company. Little was accomplished under this management. In 1903, Thomas Churchill of San Francisco purchased the property for an undisclosed sum and leased it to the Arkell brothers. Early in 1905 the Yosemite Mining Company made an unsuccessful attempt to open the Hite mine and later that year the properties were purchased by W. M. Kirkhoff and associates of Minneapolis. The mine was active, apparently under lease, in 1909 and 1912 and some production was made during the latter year. By 1916, ownership had passed to J. S. Spillman of San Francisco who held the property until the late 1930s. About 1938 it was acquired by Minerals Engineering Company of Los Angeles. This company did some work but no production was recorded. In 1953-54 a road was cleared across very difficult terrain from Incline almost to the mine and it may be reopened in the near future.

The total production of the Hite mine has been estimated at various figures between $2,750,000 and $3,000,000. (Min. and Sci. Press, vol. 81, no. 10, p. 287; Julihn and Horton, 1940, p. 145) U. S. Bureau of Mines figures show that about $55,000 in gold and silver was produced from the mine between 1896 and 1912 but no precise figures are available for the period 1862 to 1896. Published reports in the Mining and Scientific Press show that $250,000 was realized during 1878 and similar amounts for several preceding years. A large percentage of the ore mined prior to 1879 ran more than $40 per ton at the old price of gold. The lowest grade of ore mined was taken out between 1904 and 1909 when 4625 tons of ore yielded 788.85 oz. of gold and 849 oz. of silver or an average of only $3.68 per ton. In 1912 a small tonnage of ore was mined which yielded nearly 3½ oz. of gold per ton.

At depth the Hite vein takes an almost straight course N. 70° W. through the Priest and Coleman, Hite and Giltner claims, and dips 75° to 80° north. Through the Hite Central claim, which adjoins the Giltner on the southeast, the strike of the vein swings to about N. 50° W. At the surface and to a depth of 600 feet on the Hite claim, the Hite vein splits into two branches separated by a lenticular horse of slate and schist 600 feet long and 50 feet thick at the thickest place. Vein matter in the two parts of the Hite vein varies from a few feet to more than 12 feet. Along the borders of the slate-schist horse the vein is 25 feet thick (Storms, 1894, p. 170).

A second vein striking N. 60°-70° W. and also dipping steeply north traverses the McConley and Old Dominion claims. Where observed this vein was 2-5 feet thick. A third vein striking about N. 10° E. and essentially vertical crosses the Summit claim.

The vein fissures cut metasedimentary rocks of the Paleozoic Calaveras group. Dark slate, graphitic schist, quartzite, metasandstone and dense, massive quartz-biotite hornfels are the principal wall rock types. Bedding, where discernible, is parallel to the schistosity and cleavage, has a general strike of N. 50° W. and dip of 75°-80° NE. The metasediments are cut by a variety of small dikes and sills of granitic rocks ranging in character from white aplite to dark biotite-hornblende granodiorite.

Inasmuch as most of the veins of the Hites Cove district crop out on the south slope of a steep, west-trending ridge, they have been developed almost exclusively by crosscut adits connecting with drift-levels. There are several relatively short adits on the McConley and Old Dominion claims but the principal workings are the two long adits on the Hite claim driven by Hite. The upper adit is 720 feet long, and has east drifts reaching to the Hite Central claims and west drifts for an unknown distance. The lower adit, a little more than 500 feet below and almost due south of the upper level, is 1400 feet long. It has several thousand feet of drifts on the adit level. At the end of this adit is a winze or underground shaft 330 feet deep with 3 levels, presumably 100 feet apart. The *Mining and Scientific Press* (vol. 58, no. 26, p. 611, 1894) mentions east and west drifts from the bottom of the inclined winze and a crosscut and drift driven from the footwall branch of the vein into the 14-foot wide hanging wall branch of the vein from the end of the east drift. Very little other work had been done on the hanging wall branch of the Hite vein up to 1895 but the ore apparently was of considerably lower grade than in the hanging wall side. In various places, on the lowest level the footwall vein apparently pinches out and no effort was made to follow it deeper. Most of the ore in the footwall branch of the vein above the lower adit probably has been stoped out but records are fragmentary.

Horseshoe (Bower Cave) Mine. Location: NE ¼, sec. 23, T. 2 S., R. 17 E., M.D., on the southwest side of Jordon Creek ¾ of a mile northwest of Bower Cave or 8 airline miles northeast of Coulterville. Accessible via the Greeley Hill-Smith Creek-Bower Cave road from Coulterville, a distance of about 13 miles. The road is paved as far as Dudley Hill. Ownership: Joseph Dupret Jr. and Irene Dupret, Star Route, Box 21B, Cazadero, California, own one patented claim of 20 acres. Walter D. McLean of Coulterville is mine manager.

The Horseshoe mine, known in early days as the Bower Cave mine, was discovered about 1867 probably by Andrew Rocca. In 1879 it was sold by a Dr. Austin to P. P. Mast who was operating the Bandarita and Martin Walling mines. Most of the early work on the mine was done by Mast between 1879 and 1881. Ore was milled at the Martin-Walling mill (Min. and Sci. Press, vol. 39, no. 26, p. 413, 1879; vol. 43, pp. 236, 252, 1881). By 1904 ownership of the mine had passed to Rodgers and Loomis of Springfield, Ohio (Aubery, 04, p. 11). Some work was done on the mine in 1910 by Francis B. Loomis. In 1913 the mine was bonded to T. G. Mudgett of San Francisco but no production was recorded. In July 1951 the present owners reopened the mine and it was put into active operation in November 1953. Since 1951 the mine has produced $13,800 almost entirely from development work.

There are two nearly parallel veins on the Horseshoe claim striking N. 68°-72° E. and dipping 65° SE. to vertical. The north vein, approximately 40-70 feet from the south vein, varies from a few inches to 16 inches wide and the south vein varies from 2 to 4 feet wide. Wall rocks are graphitic slate and hornfelsic quartz-biotite-graphite rock derived from clay shale and siltstone. Cleavage in the metasedimentary series strikes NW and dips SW. Vein matter consists chiefly of bluish to milky quartz, commonly ribboned with thin sheets of slate, and wall rock gouge. Ore minerals are native gold, pyrite, chalcopyrite, arsenopyrite, galena and sphalerite. Millheads assay from $30 to $50 per ton in gold.

The principal workings consist of a crosscut adit about 200 feet long, which intersects the north vein at a depth of about 125 feet, 1500 feet of drifts and secondary crosscuts from the adit level, and an underground vertical shaft or winze now being sunk on the south vein at its intersection with the crosscut. In August 1955 this shaft was down 50 feet and had 130 feet of drifts on the one sub-level.

The ore is hand-trammed from the mine to a 20-ton ore bin, passed through a jaw crusher and Huntington mill. It is ground to pass a 40-mesh screen before being passed over amalgamation plates and concentrating tables and sent through flotation cells. Sponge gold is sent to the mint and the sulfide concentrate to the Selby, California, smelter. Three men operate the mine and mill. Six tons of ore are processed per day.

Independence (Twin Springs) Mine. Location: NE ¼ sec. 23, T. 3 S., R. 18 E., M.D., on the Jenkins Hill road half a mile (airline) east of the Briceburg-Kinsley road but about 3½ miles from the Briceburg road via the unimproved Jenkins Hill road. Ownership: Charles Jordan, 633 Green Ave., San Bruno, California owns one unpatented claim of about 20 acres, but ownership was disputed in August 1955 by other individuals.

The authors were unable to gather any information on the early history of this property. At the time it was reactivated under lease by Delaney and Rohrback in 1934 the workings were extensive. One shoot mined between 1932 and 1934 ran between $80 and $140 per ton (George Matlock, personal communication, 1955). The claim is operated intermittently by the listed owner and by other individuals who also claim ownership.

The Independence vein strikes N. 55° W., dips 75-80° NE. and averages about 18 inches wide. Vein matter is ribbon quartz with pyrite, galena, and native gold. Wall rocks are slate and schist of the Paleozoic Calaveras group intruded by granitic dikes. The dikes commonly are schistose and well altered.

The principal working is a crosscut adit 300 feet long driven northeast to the vein and striking it 50 to 60 feet below the surface outcrop. From the end of the crosscut a drift has been run about 200 feet northwest and 100 feet southeast developing 300 feet of backs averaging at least 50 feet high. Much of the vein between the crosscut and the surface has been stoped, but no work has been done below the crosscut level.

Iron Duke Mine. Location: NW¼ sec. 4, T. 4 S., S. 16 E., SW¼ sec. 33, 3 S., 16 E., M.D., in the northwestern part of Hunter Valley about 5 miles by paved and graded dirt road from the intersection of the paved Bear Valley-Hornitos road. Ownership: Mrs. Louise M. Broad, 3469 Twentieth St., San Francisco, California, owns five unpatented claims, the Iron Duke, Commercial, Pedro, Protection and Protection No. 1.

The Iron Duke mine was discovered prior to 1865, probably about the same time as the Oakes and Reese mine, which adjoins it on the northwest. During the early history of operations a 100-foot shaft was sunk at the junction of the principal Blue Lead vein and an intersecting cutter vein. During the sinking of the shaft a small pocket of ore was found which yielded 190 oz. of gold (Julihn and Horton, 1940, p. 119). The property was worked from time to time by lessees but the principal periods of exploration were 1934-35 under E. F. McTarnahan and 1938-

41 under J. O. Gillice. It has been idle, except for assessment work, since 1940. In July 1954 the underground workings were inaccessible because of flooding. There was no headframe but a hoist house, compressor house, blacksmith shop, mill building, watchman's cabin and some milling equipment were on the property.

The Iron Duke claim is oriented on the Blue Lead which passes through the adjoining Iron Duke and Carson mines as well as several others in the district. This vein strikes N. 30-35° W., dips east at an average of 61°, averages 4 feet wide, and is traceable for 1500 feet (the entire length of the claim). It is joined at angles between 45° and 90° by a series of cutter veins spaced about 250 feet apart. These enter the Blue Lead from the west but do not cross it (Gillice, J. O., private report). Most of the ore has been taken where the cutter veins join the Blue Lead or from the cutter veins themselves, but some small ore shoots have been found in the Blue Lead on the adjoining Oakes and Reese property. The two Protection claims and the Commercial claim cover extensions of the cutter veins followed west from the Iron Duke claim. Several of the cutter veins have been traced west of the Blue Lead for more than 600 feet.

The Blue Lead follows a fissure which in general lies between basalt and andesite greenstone on the west and tuffaceous slate and chert on the east. The cutter veins are found entirely in greenstone. The wall rocks are part of the Upper Jurassic Amador group (Taliaferro, 1943, pp. 282-284) which is predominantly a volcanic assemblage.

The principal working is single compartment and manway shaft 200 feet deep inclined 61°. At the 185-foot level a drift was run south 500 feet to Cutter Vein No. 2 and a secondary drift was driven west 100 feet on Cutter No. 2. This secondary drift encountered an ore shoot and a 30-foot raise was driven, but no stoping was done (Gillice, J. O., private report, p. 6). One powder box full of ore taken from a pocket in this shoot yielded $524. The main drift was continued south to the junction point with Cutter Vein No. 3 and a 75-foot drift was run west on that secondary vein (Julihn and Horton, 1940, p. 119). In addition to the main workings there is a partly caved 35-foot shaft and numerous shallow surface workings in the vicinity of Specimen Hill on the Iron Duke claim.

According to Gillice (private report) $16,000 in gold was taken from shallow workings on Specimen Hill, $3800 was taken from a small stope at the junction of the Blue Lead and Cutter Vein No. 1 at a depth of 104 feet, and $2000 was recovered during driving of the raise on Cutter Vein No. 2. U. S. Bureau of Mines records indicate a gold production of $2000 for the period 1932-1941. Except for occasional pockets of bonanza rock the average milling ore runs about $10 per ton at a gold price of $35 per oz. Sulfide concentrates, chiefly marcasite and arsenopyrite, rarely contain more than $50 per ton (Julihn and Horton, 1940, p. 119).

Jumper (Jumper and Bear) Mine. Location: N½ sec. 30, T. 4 S., R. 17 E., M.D., on top of Bear Valley Mountain 2½ airline miles west of Bear Valley. Accessible via 1 mile of unimproved dirt road from the surfaced Bear Valley-Hornitos road. Ownership: Not determined. Last operator was C. H. Burt of Bear Valley. Property originally consisted of two claims, the Jumper and Cold Springs or Bear embracing about 35 acres.

The Jumper mine was discovered in the 1850s, worked intermittently to 1917 and almost continuously in a small way from 1917 to 1937. Ore, though not present in large shoots, ran from ½ to 1 oz. of gold per ton. Most of the work from 1917 to 1940 was done by C. H. Burt of Bear Valley. There has been no recorded production from the mine since 1940.

According to Laizure (1928, p. 91) there are two nearly flat, laminated quartz veins one above the other, varying from a few inches to more than 4 feet wide which carry very finely divided native gold. These apparently strike N. 75-80° E. but are well obscured by soil mantle. The lowest mill run made in the late 1920s gave a recovery of $19 per ton at a gold price of $20.67 per oz. Production records for the period 1925-28 show a yield of nearly 1 oz. of gold per ton. Between 1919 and 1922 over 621 oz. of gold and 75 oz. of silver was obtained from only 43 tons of ore.

In September 1954, there were 3 inclined shafts less than 100 feet apart watered and partly filled with debris. One of these is at least 180 feet deep (Laizure, 1928, p. 91). There are also two vertical shafts open to a depth of at least 100 feet, three other caved shafts and numerous partly caved stopes and open cuts. There was a small Gibson mill and a steam engine on the property when it was last visited in 1954.

Juniper (Juniper and Patricia, Patricia and Charles) Mine. Location: SW¼ sec. 19 and NW¼ sec. 30, T. 4 S., R. 17 E., on Bear Valley Mountain 2½ miles west of Bear Valley. Accessible via half a mile of unimproved dirt road from the surfaced Bear Valley-Hornitos road. Ownership: Pereno O. Zirker, Pearl Crowell, Ella B. Edwards and Hallett B. Hammatt, 832 Franklin St., Monterey, California own a patented claim of 20 acres and several unpatented claims. The property originally included the Juniper, Independence, Starlight (Patricia) and Mt. View lode claims and the Independencio placer claim. One of these claims apparently was renamed the Charles.

As nearly as can be determined from meager early records, the Juniper group of claims was probably first located in the 1850s about the same time as the adjacent Jumper mine. The mine was known to be active in 1882 with Stephen Arthur as superintendent and Samuel C. Bates as principal owner (Min. and Sci. Press, vol. 45, no. 12, p. 180, 1882). Later C. C. Schlageter of Mariposa came into possession of part of the claims and others were acquired by the Zirker family. The last period of operation was 1933-37 when both properties were leased by George L. Reed of Bear Valley and worked under the direction of Warren Dutton and D. R. Jones. There has been no apparent recent activity at the mine.

There are two sets of veins in the Juniper group of claims. The veins on the Juniper and old Mountain View claims strike roughly north but are somewhat sinuous and dip east and angles between 45° and 60°. Those on the Starlight (Patricia) and Independence claims strike generally northwest but are somewhat arcuate and dip northeast at angles similar to those of the other vein system. Some vein offshoots from the north-trending system strike east of north and tend to be steeper than the main veins. Vein widths vary from 1 foot to 5 feet. Wall rocks are massive and schistose greenstone derived from pyroxene andesite. They are of Upper Jurassic age.

The Juniper vein is opened by an adit level 500 feet long which reaches a vertical depth on the vein of 130 feet at the south end. There are several partly caved stopes or airshafts from this level to the surface giving a total footage of workings of about 800 feet (Laizure, 1935, p. 34). On the Starlight or Patricia claim there is a 320-foot vertical shaft with several hundred feet of drifts. These workings were partly caved and inaccessible in August 1955.

Data on the production of the mine is incomplete but the total tonnage of ore is relatively small. At least 1000 tons were milled between 1919 and 1940 with returns running from 14.4 oz. of gold and 4 oz. of silver per ton to 0.35 oz. of gold per ton. The average tenor of ore was about 1.04 oz. of gold and a fraction of an ounce of silver per ton.

Lafayette and Lafayette Extension (Ghirardelli) Mine. Location: Sec. 15, T. S., R. 16 E., M. D. near the south end of Hunter Valley west of the paved Hunter Valley road and ¾ of a mile north of the Pyramid mine. Ownership: Louis and Gabriel Queriolo, 861 San Ramon Way, Sacramento 21, California, owns two claims, part of a parcel of patented argicultural land.

The Lafayette mine is an old property active chiefly in 1866-67. In 1866 it was being operated by a San Francisco group headed by Samuel Miller with H. C. Treon as superintendent (Min. and Sci. Press, vol. 12, no. 18, p. 274, 1886). Late that year an inclined shaft had been sunk to a depth of 90 feet and a vertical shaft 70 feet deep. A 4-stamp mill was in operation. The ore yielded $25-$30 per ton. By 1867 ownership had passed to D. Ghirardelli of Oakland. The vein varied from 1 foot to 3 feet thick and was yielding $30-$40 per ton (Min. and Sci. Press, vol. 15, no. 15, p. 69, 1867; vol. 17, no. 3, p. 38, 1868). By 1920 ownership of the property had passed to Dr. C. A. Queriolo of Oakland and has remained in the Queriolo family to the present.

The Lafayette vein is narrow but ore shoots have been consistently of good grade. It strikes north and dips east at about 40°. The vein fissure has developed along or close to the contact of pyroxene andesite greenstone of the Logtown Ridge member of the Upper Jurassic Amador group and laminated tuffaceous sediments of the Hunter Valley chert member of the same group (Taliaferro, 1943, pp. 282-284).

Workings are inaccessible and there has been no recent work done on the mine.

Landrum (Barley Field) Simeon Landrum Mine. Location: Secs. 27, 34, T. 4 S., R. 18 E., M.D., 1 mile south of Colorado School just west of the Colorado-Sherlock Creek road and 5½ airline miles northeast of Mariposa. Ownership: George Matlock, Mariposa, California, owns the Old Standby claim containing 20 acres, surveyed but not yet patented.

The Landrum or Barley Field mine was discovered sometime prior to 1889, probably by Joseph Landrum. In 1899 it apparently was operated in conjunction with the Champion mine by a partnership of James Ridgway, Colonel Dunbar and Mr. Hay (see Champion II mine). The property originally consisted of 3 claims including the Simeon Landrum and Old Standby, but the others apparently were abandoned prior to 1928 when the property passed to Harry I. Maddox of Merced.

Most of the production of the mine was never recorded, but from 1897 to 1905 about 250 oz. of gold was produced from an unknown tonnage of ore (U. S. Bureau of Mines records). Some shallow exploratory work is done from time to time by the present owner but underground workings are difficult to support and the rather extensive old workings cannot be entered. The mine is characterized by pockets of very rich ore which are in places found in vein quartz and in others in disintegrated dike material.

The main Landrum vein of brecciated milky quartz strikes N. 35-40° W., dips 45° SW. and averages 2-4 feet wide. It is accompanied over much of its length by a clayey, much altered dike, mineralized in part, so that the ore-bearing zone is, in places, over 10 feet wide. Wall rocks are hornblende-biotite granodiorite and finer-grained feldspar porphyries. A second vein crops out 50-60 feet southwest of the main vein and roughly parallel thereto. In the few places it is exposed it is 4-5 feet wide and dips 50 to 65 degrees southwest. About 400 feet northwest of the end-line of the Old Standby claim and slightly en echelon to the Landrum vein is a 2-foot wide vein of bluish, glassy quartz carrying abundant chalcopyrite.

In the 1920's there was 90-foot shaft serving over 800 feet of drifts. In September 1955 these workings had been almost obliterated but the course of the vein is marked by a long series of shallow open cuts some of which may once have been stopes. All of the present work is done from shallow open workings. Owing to the softness of the vein and surrounding rock open-cut mining by steam shovel might be feasible in the dry season.

Live Oak and Governor (Stud Horse Flat group, Live Oak group, White Oak group) Mines. Location: Sec. 35, T. 3 S., R. 16 E., M. D. on the south side of Merced River Canyon 2 miles northwest of Bagby. Accessible by 3½ miles of jeep and foot trail from the Schoolhouse mine on the paved Hunter Valley Road. Ownership: North American Gold Mines, Inc., c/o Ada Stewart, 25 Delmar Ave., San Jose, California owns a group of unpatented claims and several mill sites, notably the Live Oak, Governor, Red Oak, Monitor, Grand View, Henrietta, Lincoln and Roosevelt claims.

Originally known as the Stud Horse Flat group of mines, the Live Oak and Governor probably were discovered in the 1890s or early 1900s. A 3-stamp mill, one of the early installations at the mines, burned in 1907 (Castello, 1921, p. 139). The first owner of record is John P. Carroll of Bagby who intermittently operated the property from about 1910 to the late 1930s. In 1914 workings consisted of a 140-foot shaft with two levels, 300 feet of drifts and a stope 250 feet long and 60 feet high; also several shallow shafts and short tunnels (Lowell, 1916, p. 598). The property was bonded for a short period in 1918 to a Los Angeles company, but no production was recorded (Castello, 1921, p. 139) and a 5-stamp mill brought on to the property was never erected. During the 1920s John Carroll ran a 225-foot crosscut adit southwest to the vein cutting it at a depth of 68 feet. From this crosscut a 250-foot southeast drift was run, a winze put down 20 feet and a raise put up to the surface (Laizure, 1928, p. 95). During the early 1930s a 250-foot double compartment shaft was sunk 25 feet southeast of the crosscut adit, the drift from the 68 or adit level was lengthened to 322 feet and drifts on the 225-foot level were run 250 feet northwest and 250-feet southeast of the shaft. There has been little activity at the mine other than assessment work since 1938.

The Live Oak vein strikes northwest and dips about 75° southwest. It can be followed at the surface for more than a mile, averages 3-4 feet wide and reaches a maximum width of 10 feet. A smaller cutter vein, the Roosevelt, intersects the main vein crossing the Roosevelt and Lincoln claims. Vein matter is milky quartz with native gold, galena, and pyrite. Wall rocks are pyroxene andesite greenstones of the Peñon Blanco member of the Upper Jurassic Amador group (Taliaferro, 1943, pp. 282-284). The greenstones contact the Mariposa slate about half a mile east of the mine.

Most of the workings have been described previously. The two shafts on the Live Oak claim are 212 feet apart, the more southerly caved above the 68-foot level, but the main (northerly) shaft in good condition. On the Governor claim are two adits, a lower, 112 feet long, and a second one 50 feet higher, 20 feet long with a 10-foot winze near the end (Julihn and Horton, 1940, p. 128).

The Carrolls estimated in 1932 that there was 14,000 tons of ore between the 68-foot and 225-foot levels from the main shaft that would average $10.50 per ton. There is no record of any of this having been removed, but recorded production from the mine between 1931 and 1934 indicated that some ore ran considerably less than $10.50 per ton. (U. S. Bureau of Mines records) Some sampling data are included in accounts by Julihn and Horton and Laizure, references previously cited. The authors were unable to get an accurate estimate of the total production from the Live Oak and Governor group of mines.

Long Mary Mine. Location: Sec. 17, T. 5 S., R. 17 E., M.D., ¼ of a mile north of the Mount Bullion-Hornitos road and 6 miles by paved road west of Mount Bullion. Ownership: Not determined. Most of the land in this area has reverted to agricultural status. Property was for many years a part of the holdings of the Mariposa Commercial and Mining Company.

The Long Mary mine has a long history dating back prior to 1900. Most of the recorded activity has been by lessees working with the management of Las Mariposas Grant. The principal periods of activity were 1900-1905; 1908-11 and 1914-1915. During this span of time the mine produced 9348.9 tons of ore which yielded $108,928.44 or an average of $11.65 per ton at the old price of gold. (Logan, 1935, p. 188) The entire surface installations including a 5-stamp mill were destroyed by a forest fire in 1927 (Laizure, 1928, p. 95). In 1939 an option to purchase the Long Mary and several other prominent Las Mariposas Grant mines was granted to the San Rosario Mining Company headed by A. R. Gordon of Washington, D. C., but the deal was never consummated. (Eng. and Min. Jour., vol. 140, no. 7, p. 62, 1939). There has been no production from the mine since 1915 and the workings are inaccessible.

The Long Mary vein strikes N. 85° W., dips 65° south and averages about 2 feet wide. Wall rocks are slate of the Upper Jurassic Mariposa formation. Vein matter is milky quartz with native gold and pyrite. The principal ore shoot was 350 feet long and at least 400 feet deep, judging from the shape of the stopes reported by Castello (1921, p. 121).

In 1920, the workings consisted of a 413-foot inclined shaft with 4 levels and an adit 263 feet long. There were 360 feet of drifts on the 200-level, 383 feet on the 300-level, 315 feet on the 350-level and 163 feet on the 400-level plus 900 feet of raises and a stoped area 400 feet high and 350 feet long (Castello, 1921, p. 121).

Louis and Louis Extension Mines. Location: Sec. 11, 5S., 17E., M.D., half a mile southwest of the Mt. Opher Mint historical marker on Highway 49. Adjoins the Mountain View mine on the southeast and is half mile northwest of the Greens Gulch mine. Ownership: Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa, California owns a parcel of land containing 240 acres that includes the Mt. View, Louis, and Louis Extension mines.

The Louis and Louis Extension are adjoining claims, on a conspicuous quartz vein of the Mother Lode system and probably were first opened up in the 1850s. Throughout its history it has been operated principally under lease from the management of the Mariposa Grant, most notably from the Mariposa Commercial and Mining Company. The principal periods of activity have been 1900-1903, 1905-06, and 1912. In this period the Louis claim produced 1240.14 tons of ore from which gold worth $27,691.33 was extracted or an average of $22.36 per ton at the former price of gold. The Louis Extension, last active in 1912, produced 10 tons of ore yielding $141.42 or $14.14 per ton (Logan, 1935, p. 188).

Through the Louis and Louis Extension claims the main vein strikes approximately N. 62° W. and dips 55° NE. As it reaches the Mt. View claim farther to the northwest the strike changes to about N. 47° W. According to Lowell (1916, p. 586) the vein exposed in the workings averages 4 feet wide. At the surface much of it is obscured by mantle. Wall rock is black slate belonging to the Upper Jurassic Mariposa formation. Vein matter is chiefly milky quartz containing native gold. According to Castello (1921, p. 121) the sulfide content is low. Castello mentions a second, presumably parallel, quartz vein also 4 feet wide but lists no further details. This could be any of several veins in the vicinity.

In 1920, the workings included a vertical shaft 375 feet deep with three levels at 100-foot intervals, several crosscuts and winzes and a 150-foot air shaft. There were 275 feet of drifts on the 100-level, 75 feet on the 200-level and 500 feet on the 300-level. Crosscuts totaled 775 feet and winzes 600 feet. None of the workings were accessible in September 1954. The site of the main shaft is marked by a large white dump.

Louisa (Louise, Louise Point) Mine. Location: Sec. 3, T. 3 S., R. 16 E., M.D., astride State Highway 49, $\frac{1}{4}$ of a mile south of Coulterville. Ownership: Walter J. Lautenschlager, 626 South Catalina St., Los Angeles 5, California, owns a patented property of 25.29 acres.

The Louisa mine is typical of the Mother Lode mines in northern Mariposa County. The prominent, massive, milky quartz reef and accompanying quartz-mariposite-ankerite vein matter crossing Highway 49 just below Coulterville make well-known landmarks in the southern part of the gold belt. Early records of the mine have been lost but it undoubtedly was one of the first claims to be located in the 1850s, the vein system being the most conspicuous in the Coulterville district short of the Peñon Blanco itself. The principal period of activity at the mine was 1894-1900 when the Merced Gold Mining Company, J. R. Gilbert, superintendent, spent more than $56,000 in improvements and development work (Eng. and Min. Jour., vol. 61, no. 3, p. 68, 1896). Milling was done at the Potosi mill 1½ miles to the west. Prior to acquisition of the mine by Merced Gold Mining Company the property was part of the 20,000 acre Cook Estate. A General Boyd of San Francisco owned the property for a short period about 1893-94 (Storms, 1896, p. 172). There has been no sustained work on the mine since 1900. No equipment is on the property and the workings are inaccessible.

The east branch of the Mother Lode passing the length of the Louisa claim is a broad, multiple vein more than 300 feet wide striking N. 40-45° W. and dipping 70-75° NE. The bulk of the vein consists of quartz-mariposite-ankerite rock derived in considerable part from hydrothermal alteration of serpentine. Several tabular to lenticular sheets of massive, milky quartz traverse the quartz-mariposite-ankerite rock in sub-parallel or braided fashion and the adjoining masses of vein matter are interlaced by stringers of milky quartz. In the upper, oxidized parts of the vein system the quartz-mariposite-ankerite rock has been converted to a spongy, rust-colored, earthy rock consisting chiefly of yellow oxides of iron intermixed with quartz stringers. Ore shoots of native gold and auriferous pyrite commonly are large but of relatively low grade. They generally are found in quartz-mariposite-ankerite rock on the hanging wall or footwall side of the massive quartz subveins. The bulk of ore produced ran less than $12 per ton at the former price of gold. According to Storms (1896, p. 172) when the vein matter was solid mariposite-ankerite rock without quartz or a brecciated appearance the gold content in the ore was too small to pay.

The vein system in the east branch of the Mother Lode lies along the contact of black slates of the Upper Jurassic Mariposa formation and massive pyroxene andesite greenstone probably belonging to the Peñon Blanco member of the predominantly volcanic Amador group, also of Upper Jurassic age. A good sketch of the vein system, as seen in plan, has been drawn by Storms (1896, p. 172). The rock marked diabase on the sketch is greenstone derived from pyroxene andesite.

In 1900, workings consisted of the vertical Nelson shaft 375 feet deep with 3 levels and an air shaft 150 feet deep. There were 275 feet of drifts on the 100-level, 75 feet on the 200-level and 500 feet on the 300-level, plus crosscuts totaling 775 feet and winzes totaling 600 feet (Laizure, 1928, p. 96).

Louisiana Mine. Location: Secs. 25, 26, T. 2 S., R. 17 E., 12 miles by road east of Coulterville via the Greeley Hill, McDiermid guard station (U. S. Forest Service) and Dutch Creek roads. Adjoins the Bondurant mine on the northwest. Ownership: Sarah W. Treat, c/o Mrs. Robert Sherman, 975 Roble Ridge Road, Palo Alto, California, owns a patented property of 30 acres. The Louisiana claim covers 3500 feet in the vein.

Discovery of the Louisiana mine was probably made in the early 1860s. In January 1866 the mine was purchased and placed in operation by the Heslep family (Min. and Sci. Press, vol. 12, no. 3, p. 40, 1866). Judge Heslep, W. C. Heslep and his son P. C. Heslep operated the property until the spring of 1867. During this period ore ran from \$10 to \$50 per ton plus the yield of a sulfide concentrate not readily reduced which assayed \$100 to \$500 per ton. Some interesting machinery was installed by the Hesleps and their predecessors including two mechanically driven sledge hammers made by Rex, Logan and Company, a walking-beam type of pumping engine (English-made) and a Hogan de-sulfurizing furnace burning hydrogen gas. The sulfide concentrates could be handled in this furnace for \$1 per ton (Min. and Sci. Press, vol. 12, no. 3, p. 40, 1866). At the time the Hesleps took over the mine there was a crosscut tunnel 200 feet long cutting the vein at a depth of 100 feet and a connecting shaft from the surface. In the spring of 1867 management passed into the hands of Colonel Conley, terminating a short layoff. The Louisiana claim was patented in February 9, 1878 (Julihn and Horton, 1940, p. 136) and was active at least intermittently through the 1870s and 1880s. About 1891 three additional shafts were sunk and a 4-stamp mill installed. A. C. Cable superintended operations for J. J. Grove of San Francisco at the mine in 1896 (Min. and Sci. Press, vol. 73, no. 12, p. 242, 1896). In 1898 the owners gave up operation of the mine but it was leased for a short period by former employees who took out 600 or 700 tons of ore which yielded \$10,330.98 (Julihn and Horton, 1940, p. 136). In 1911 the property was bonded to G. F. Dyer of Merced who apparently did some exploration and development work but no mining. By 1920 ownership of the mine had passed to C. P. Treat and the mine was put under option by A. T. Adams of the Bondurant mine (Castello, 1921, p. 126), but final sale was not consummated. The mine has remained in the Treat family since that time. In 1953 and 1954 some work was done on the north end of the claim by E. W. Ferguson of Coulterville.

Massive white quartz of the Louisiana vein is boldly exposed at the crest of a low ridge north of the road through the Bondurant property. It strikes N. 70° W., dips 55° NE. and ranges from 2 feet to more than 15 feet wide. The southwest or hanging wall side of the vein consists mainly of massive milky quartz in which gold values are low. The best ore apparently is concentrated in the 3- to 6-foot wide part of the vein nearest the footwall (Julihn and Horton, 1940, p. 137). The best grade of ore apparently came from the southeast half of the claim, judging from the concentration of workings there. Vein matter in the ore shoots consists of native gold, galena, sphalerite and pyrite, pyrite being most abundant. Julihn and Horton (op. cit.) stated that the ore would probably average $1\frac{1}{2}$ to $2\frac{1}{2}$ percent sulfides. Wall rocks are mainly black slate and graphitic mica schist, metasediments belonging to the Paleozoic Calaveras group. The vein is accompanied over part of its length by a badly altered ochrous granitic rock. According to Julihn and Horton the vein contains ore for more than 1200 feet of strike length, principally on the hanging wall side. Samples ran from \$6 to \$15 per ton, presumably at the present price of gold. The mine production figures have not been recorded.

There are five shafts of various depths on the property exclusive of the one started recently on the hanging wall side of the vein near the north end of the claim. The Number 2 shaft is reported to be 250 feet deep and the No. 3 shaft 150 feet deep (Julihn and Horton, 1940, p. 138). The various shafts could not be distinguished one from the other at the time of the authors' visit in 1954. There are 2 tunnels on the northwest part of the claim which could easily be cleaned out and an undetermined number of other adits on the southeastern part of the claim.

Lovely Rogers (Cherokee, Shimer) Mine. Location: Center sec. 11, T. 3 S., R. 17 E., M.D., in a saddle half a mile south of the Gentry Gulch road and 1 mile west of the Hasloe mine. Accessible by road via the Martin Walling or Gold King mine. Ownership: Mrs. Nettie Shimer Hauck, et al., Yosemite National Park, California, owns one partially patented claim of 12.57 acres.

The Lovely Rogers mine was discovered by a Cherokee Indian named Rogers in 1857 (Browne, 1868, p. 32). Rogers operated the mine by hand methods for several years, recovering gold from high-grade surface ore by crushing the ore in a hand mortar. In 1859 an 8-stamp steam mill and two arrastras were built, ore milled yielding $35 per ton. The mill apparently never paid its way and was sold at sheriff's sale in the early 1860s. During the 1880s and 1890s the mine was worked intermittently by the Shimer Brothers and ownership has remained in the Shimer family up to the present. There has been no recent work done on the mine.

According to Laizure (1928, p. 96) there are three more or less parallel veins on the Lovely Rogers claim. None of the veins exceed 3 feet in width. The principal vein is narrow and sinuous and the strike varies from N. 56° W. to N. 73° W. It dips about 70° northeast. Wall rocks are slate and massive quartz-biotite rock that is commonly hornfelsic. These are metasediments belonging to the Paleozoic Calaveras group. The metasediments are cut by several narrow, dark granitic dikes.

Principal workings are a shaft 100 feet deep and three adit levels, 400, 300 and 250 feet long, respectively. There is also a 70-foot crosscut and an 80-foot winze from one of the adit levels, several shallow shafts or pits on the northwest third of the claim and numerous open cuts along the vein over the southeast two-thirds of the claim.

Malone (Bear Creek) Mine. Location: Sec. 5, T. 5 S., R. 19 E., half a mile east of Bear Creek School and State Highway 140 and 1½ miles south of Midpines. Ownership: Not determined.

The Malone mine was located in 1880 and carries the discoverer's name. In 1881 the shaft was down 60 feet with George McCaffery superintending the operation for Malone (Min. and Sci. Press, vol. 42, no. 18, p. 276). In 1883 the property was being operated under lease by J. Mitchell and Company. These operators had a 5-stamp mill working and were driving a tunnel (Min. and Sci. Press, vol. 46, no. 16, p. 268). The mine was intermittently active under adverse conditions through the 1880s constantly hampered by inadequate financing. McCormick and Hay were the operators in 1889 and Koch and Mitchell in 1890 (Min. and Sci. Press, vol. 61, no. 5, p. 70 and no. 13, p. 202). In 1914

W. H. Johnson operated the mine and 5-stamp mill (Min. and Sci. Press, vol. 108, no. 23, p. 945). By 1915 ownership had passed to the Golden Wreath Mining Company (Lowell, 1916, p. 587) but the mine had to be sold that year to satisfy debts incurred by the company. Between 1915 and 1919 the property was intermittently active, principally by Thomas Gordon and associates. Will Johnson worked the mine for a short time in 1919 (Castello, 1921, p. 122) under lease from Gordon, and three men also leased it for a while in 1935 (Laizure, 1935, p. 37). The property has been idle for many years. It is on patented agricultural land.

A series of five roughly parallel, narrow quartz veins crosses the Malone property. The main vein strikes N. 35° W. and dips 35-40° SW. It varies from a few inches to 3½ feet wide. The other veins are narrower and less persistent. The veins cut a small, roughly circular intrusion of granitic rock three-quarters of a mile in diameter which has intruded schistose and massive greenstone. The eroded upper parts of the veins apparently yielded considerable placer gold prior to 1880. Vein matter is ribbon quartz containing thin sheets of altered wall rock, abundant auriferous pyrite and some free gold (Preston, 1890, p. 300-302). The principal ore shoot is over 350 feet long and pitched steeply northwest. It has been stoped to a depth of about 90 feet but the total depth of the shoot has not been reached. According to Preston (1890, p. 302) the ore averaged about $14 per ton at a price of $7.50 to $18.00 per ounce.

Workings consist of a 200-foot inclined shaft, which reaches a vertical depth of 140 feet, 2 airshafts 30 and 75 feet deep, respectively, and a drift adit and connecting crosscut tunnel 600 feet long.

Malvina Group (Potosi, Mahoney, Douglass, D. Cook, Merced). Location: Secs. 4, 9, 10, T. 3 S., R. 16 E., and secs. 32, 32, T. 2 S., R. 16 E., M.D., along Maxwell and Black Creeks just west of Coulterville. Ownership: Walter J. Lautenschlager, 626 So. Catalina St., Los Angeles 5, California, owns 14 patented claims and several mill sites aggregating over 300 acres.

The Malvina and adjacent claims were first located in 1852 (Goodyear, 1888, p. 347). According to news items in the *Mining and Scientific Press* much of the early work was done by the Maxwell Creek Mining Company more popularly known as the French Company. F. L. A. Pioche was the principal owner in the company. In 1867 most of the claims on the Malvina vein were sold to Douglass, Chamberlain and Company of San Francisco, Gilbert Douglass being the principal partner. By the end of that year four shafts had been sunk but the portion of these shafts was not recorded. A 440-foot adit was also driven which followed the vein for 330 feet (Logan, 1935, p. 183). By 1876 the Douglass Company had erected a 20-stamp, steam-driven mill on or near the Potosi claim. About 1878 the claims on both the Malvina and Mary Harrison veins were sold to Seth Cook and Company. This company rapidly acquired properties in the Coulterville district which ultimately aggregated 22,000 acres. In the spring of 1880 the Cook Company commenced driving a tunnel from Black Creek south for more than 3,000 feet to get under the supper workings of the Malvina claims. This was completed in 1881 and was used for many years as a haulageway for ore from the Malvina and adjoining claims to the Potosi mill.

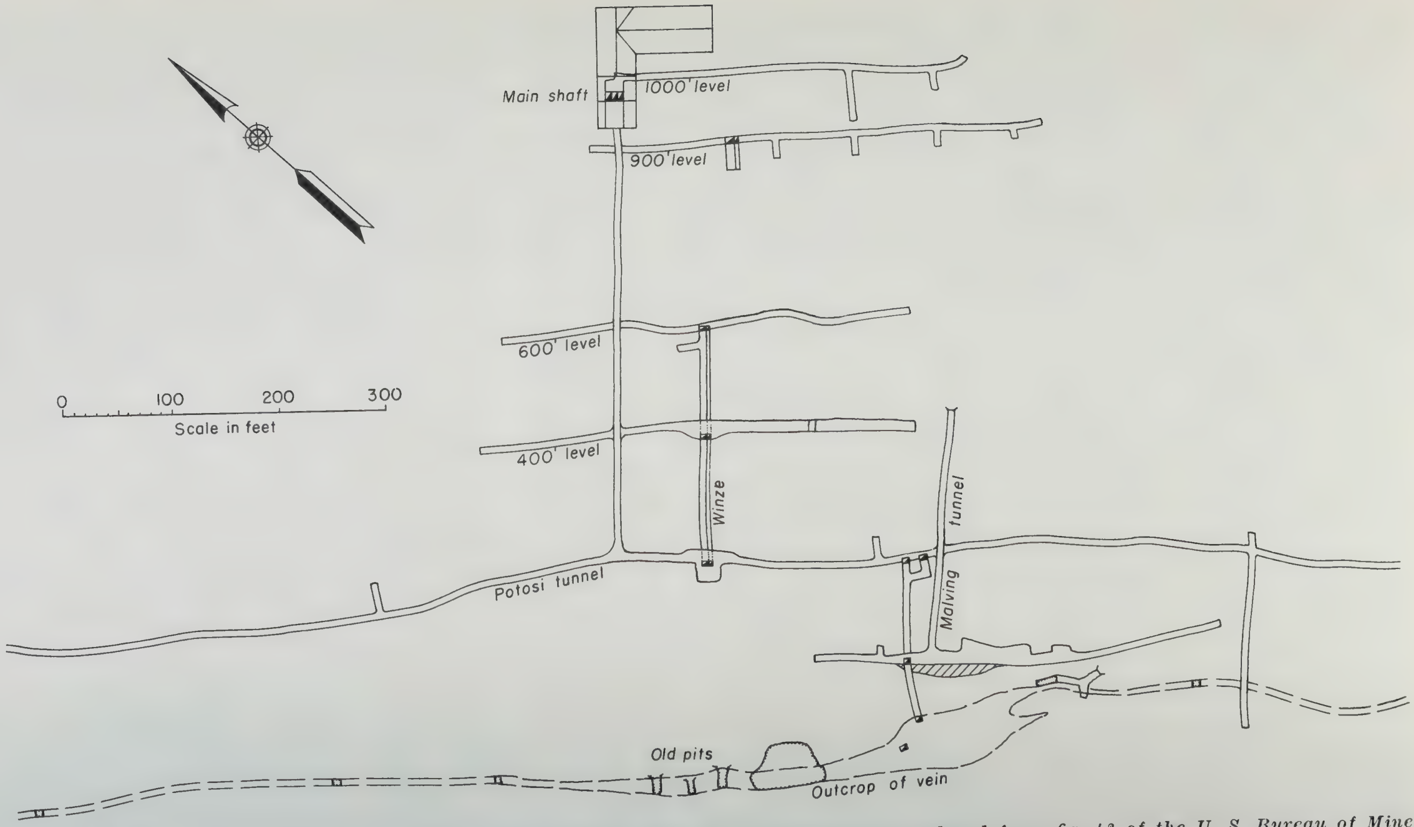
Main shaft
1000' level
900' level
600' level
400' level
0
100
200
300
Scale in feet
Winze
Potosi tunnel
Malving
tunnel
Old pits
Outcrop of vein

FIGURE 26. Plan drawing of the Malvina mine on the Mother Lode near Coulterville. *Reproduced from fig. 43 of the U. S. Bureau of Mines Bulletin 424 (Julihn and Horton, 1940).*

Operations by the Seth Cook and Company apparently ceased about 1882 and the properties remained idle until about 1894 when the Cook Estate was acquired by the Merced Gold Mining Company. This company was headed by John W. Mackay, John P. Jones and Alvinza Hayward. Captain Couch and Captain Ward were their mine superintendents. The Merced Company was unable to keep the grade of ore sufficiently high to pay expenses. The Malvina mine was closed down on August 1, 1897 and the Mary Harrison later that year. The Malvina group remained idle until 1910. For a short period that year the D. E. Lutes Company operated the Mahoney claims. In 1911 H. P. Daulton of Alameda did some work on some of the claims on both the Malvina and Mary Harrison veins but was unsuccessful in making any sustained production (Mining and Sci. Press, vol. 102, no. 18, p. 640, 1911). By 1920 ownership had passed to A. S. Bigelow and G. M. Hyams of Boston and some work was done at the mine superintended by C. I. Mentzer of Coulterville (Castello, 1921, p. 123). According to Castello the ore averaged about $4 per ton. In 1933 the Boston California Mining Company, headed by Charles H. and Eric Segerstrom of Sonora, began unwatering the Malvina mine to sample 250,000 tons of .2 oz. per ton ore believed to be present from old mine records (Julihn and Horton, 1940, p. 104). By November 1934 the 1010-foot shaft had been reconditioned and exploration revealed a substantial quantity of $10 ore. From 1938 to 1942 the company milled 121,093 tons of ore which yielded 13,197 ounces of gold, 1460 oz. of silver, 4988 lbs. of lead and 24,548 lbs. of copper or an average of $3.82 per ton in gold. The properties have been idle since 1942.

The Malvina group of claims is on the Malvina vein which is generally recognized as the west branch of the Mother Lode in the Coulterville area. The vein is almost continuously traceable from the Rittershoffen claim on the south to the Mahoney claim on the north, a distance of about 2½ miles. The strike of the vein is N. 45-50° W. and the dip is 56-75° NE. In the Potosi Tunnel the Malvina vein is only 2 feet thick for much of the exposed distance (Goodyear, 1888, p. 347). Elsewhere it reaches thicknesses up to 20 feet, and the average thickness is about 10 feet. According to Goodyear (1888, p. 347) the Potosi tunnel on the Malvina No. 1 claim developed an ore shoot 400 feet long from which 3,000 tons of ore were taken which averaged $7 a ton at the old price of gold. Ore minerals are principally native gold and auriferous pyrite in a ribbon structure of milky quartz and slate. Quartz-mariposite-ankerite rock is locally present. Wall rocks are chiefly sandy slate although Logan (1935, p. 183) mentions a strip of greenstone occurring on the hanging wall side of the vein and the vein has formed only a few hundred feet from the contact between slate of the Mariposa formation and pyroxene andesite greenstone of the Peñon Blanco member of the Amador group, both formations of Upper Jurassic age. The Mariposa slate occupies a synclinal trough faulted off on the northeast by the main branch of the Mother Lode thrust. West of the Malvina vein and north of the Potosi claim there are conglomeratic beds near the base of the Mariposa formation containing quartz and slate pebbles. These beds were first described by H. W. Fairbanks in 1890. The Mariposa formation is in gradational depositional contact with the greenstones of the Amador group in this vicinity.

The principal workings and the ones most recently used (1938-42) are a 3-compartment, 1010-foot vertical shaft with levels at 200, 400, 600, and 900 and 1,000 feet on the Malvina claim and a 3,000 foot haulageway tunnel extending from the Malvina to the Potosi claims. There are more than 2287 feet of drifts and 1225 feet of crosscuts on the five levels. There is also an older inclined shaft 875 feet deep sunk on the Malvina claim, several airshafts and tunnels on the Potosi claim and numerous other workings on claims north of the Potosi, particularly on the Mahoney. None of these was readily accessible in September 1954. Most of the known ore has been stoped above the 600-level on the Malvina and Potosi claims. There was formerly a shaft at least 350 feet deep on the Potosi claims near the old mill site which had 9 levels in 1944 (Lowell, 1916, p. 594). The upper part of the shaft was filled to mill level in September 1954.

The total recorded production of the Malvina group is approximately $867,800 in gold, silver, lead and copper. Including the early production of the mine, of which there is no precise record, the claims must have produced more than $1,000,000. By far the largest proportion of this total was amassed in the periods 1897-1903 and 1938-1942. The average tenor of ore during these periods was $4 per ton although nearly half the recorded production was made during a time when gold only brought $20.67 per ounce. Much of the ore mined in the 1800s would have yielded $7-8 per ton at the present price of gold.

Marble Springs (Compromise and Eubanks) Mine. Location: Secs. 30, 31, T. 2 S., R. 18 E., in the Bull Creek district 1½ miles west of Bull Creek School and 2 miles south of Bower Cave. Accessible by good partly surfaced, partly graded dirt road from Coulterville or by graded dirt road from Briceburg on Highway 140. Ownership: George B. Glenn, 3134 East 10th St., Oakland 1, California, owns two patented claims, the Compromise and Eubanks totaling 41.3 acres.

The Marble Springs mine was discovered in either 1850 or 1851 (Browne, 1868, p. 32; Eng. and Min. Jour. Vol. 101, no. 4, p. 201, 1916). It was equipped with a 5-stamp mill using wooden stamps, one of the earliest mills built in California. According to Browne (1868, p. 32) the first owner failed to make the mine pay, and sold it to a partnership who operated about 8 years at a loss, even though the ore ran $25 per ton. After a period of idleness of several years duration the mine was purchased and reopened about 1866 by H. G. Coward. A new mill was built, the old mill having been removed. Some specimen ore was taken out by Coward that ran as high as $900 per ton and the mine was noted for the production of gold-bearing quartz for jewelry (Browne, 1868, p. 32). By 1869 the mine had again become idle, fire having destroyed the mine buildings. By 1879, ownership had passed to A. G. Black. In 1881, the mine was reopened, presumably by an English company, and a new mill and hoisting works were built. The shaft, which was 100 feet deep in 1879 was deepened to 400 feet, several hundred feet of drifts were run, and a substantial quantity of high-grade ore was taken out using Chinese labor. The amount produced during the period 1881-84 was not recorded. By 1885, the mine again had fallen idle because of a high-grading dispute between miners and Superintendent Lawrence (Min. and Sci. Press, vol. 51, No. 7, page 120, 1885). From about 1894 to 1916 the mine was owned by various

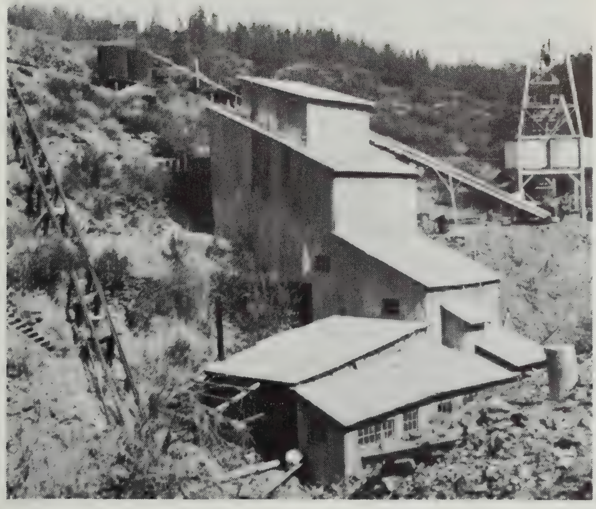

FIGURE 27. Installations at the Marble Springs mine in the Bull Creek district 7 airline miles northwest of Briceburg. Fully equipped and operated as recently as 1952, the Marble Springs mine has a long history of production totaling at least $200,000.

members of the Hilliard family, first by M. Hilliard and then by P. J. and W. W. Hilliard. The Hilliards, or their lessees, took out about $11,500 in gold and silver from the mine between 1898 and 1901 (U. S. Bureau of Mines records). The mill and hoist buildings were again destroyed by fire in 1909. In 1910 the Marble Springs Mining and Milling Company, F. M. Bernou, manager, secured a bond on the Marble Springs and North Fork mines but was unsuccessful in putting them into operation. In 1912, J. A. Flink secured an option to purchase but no deal was consummated until 1916 when a new stock company, The Marble Springs Gold Mining Company, was organized with R. C. Haywood and J. H. Flink as principal stockholders (Eng. and Min. Jour., vol. 101, no. 4, p. 201, 1916). This company continued to function under various managements and lessees until about 1943, the principal production periods being 1918-20, 1930, and 1935-43. In 1950 the Glenn-Steintorf Company took over the mine, completely renovated it, built a new mill head frame and hoist house, sunk the shaft 80 feet deeper, ran 250 feet of drifts and several raises. Operations were temporarily suspended in 1952 and Mr. Glenn since has become the sole owner.

The Compromise and Eubanks veins are segments of the same vein which strikes N. 10-15° E. and dips 35-47° E. It varies from 2 to 5 feet thick. Vein matter is milky to bluish quartz, in places carrying thin seams of wall rock, containing native gold, galena, chalcopyrite, pyrite and probably a little tetrahedrite and arsenopyrite. Old accounts in the Mining and Scientific Press and by J. Ross Browne (1868, p. 32) indicate that the main ore shoot was 400 feet long near the surface, widening and then narrowing somewhat at depth, and that there were several other shoots one of which was over 100 feet long. The main ore shoot pitched moderately south. The vein is almost continuously stoped above the 300-level for 600 total feet south of the shaft. (Perrin, Tom, personal communication, 1954). Wall rocks are chiefly massive, blue-black hornfelsic quartz-biotite rock with some inter-layered greenstone and occasional slaty and quartzitic strata. These metasediments are part of the Paleozoic Calaveras group. The vein system is intersected and accompanied by a fine-grained greenish granitic dike rock approximating quartz diorite. Dikes of this rock generally strike the vein from the hanging wall side (Castello, 1921, p. 123) but are not continuous the full length of the vein.

During the last period of operation, ore taken largely from the 400-level averaged about $10.70 per ton in gold with considerable lead and a little silver and copper. Much of the ore mined prior to that date ran better than $25 per ton at the former price of gold. Between 1936 and 1943, a total of 1767 tons of ore milled ran $24.62 per ton at the present price of gold. Incomplete records indicate that the total production of the mine must be at least $200,000.

The principal working is a 470-foot inclined shaft with four levels and several thousand feet of drifts. There is also a drift adit a short distance south of the main shaft which is 130 feet long. The vein has been stoped discontinuously for an aggregate distance of nearly 3000 feet, between the surface and the 300-level. In September, 1954 the shaft was full of water to within 20 feet of the collar. The modern mill, which includes two jaw crushers, a ball mill, rake classifiers, four flotation cells, a cone concentrator and a small Gibson mill, could quickly be put into shape for operation.

Mariposa Mine. Location: Secs. 23, 24, T. 5 S., R. 18 E., M.D., in the southeastern edge of the town of Mariposa. Ownership: Mrs. Frank E. Galhagher, 211 Twenty-sixth St., Merced, California. Under lease to George Adams of Mariposa.

The following historical summary is drawn principally from Bradley (1954, p. 32), Logan (1935, p. 184), Browne (1868, p. 28) and files of the *Mining and Scientific Press* and *Engineering and Mining Journal.*

Discovery of the Mariposa mine is generally credited to Kit Carson and two associates in the spring of 1849. As early as July 1849, Palmer-Cook and Company were crushing ore from this mine in a stamp mill. Credited by some as being the first stamp mill in California, it is certainly among the first 2 or 3 built in this state. According to Browne (1868, p. 28) the mine had produced $200,000 before litigation was settled which gave Fremont undisputed title in 1859. From 1859 to 1864 it was successfully operated by a lessee named Barnett. In 1863, Fremont sold Las Mariposas grant to a New York syndicate which, in 1864, took over direct operatjon of the Mariposa mine. The 40-stamp mill of the Greens Gulch mine was moved to the site of the Mariposa mine in 1864 and during that year the gross yield of the mine was $84,948 from ore that averaged $25 per ton (Browne, 1864, p. 29). The operating syndicate was dissolved about 1868 but the mine continued in operation until 1870 at which time the shaft was down 275 feet and the vein was described as 4 to 5½ feet wide at that depth. Although some rich ore was found on the lower level in 1870, the average grade of ore evi-

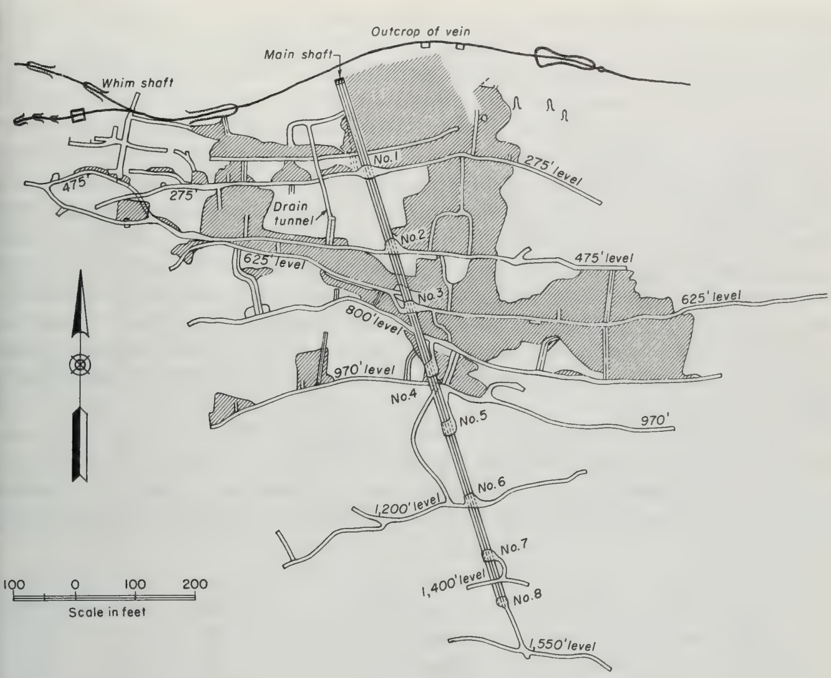
Outcrop of vein
Main shaft
Whim shaft
No. 1
275' level
475'
275'
Drain tunnel
No. 2
475' level
625' level
No. 3
625' level
800' level
970' level
No. 4
No. 5
970'
No. 6
1,200' level
No. 7
1,400' level
No. 8
1,550' level
100 0 100 200
Scale in feet

FIGURE 28. Plan drawing of the Mariposa mine workings showing stoped areas. *eproduced from fig. 55 of U. S. Bureau of Mines Bulletin 424 (Julihn and Horton, 940).*

dently fell off from $25 in 1864 to $10 or $11 per ton. The mine had produced $1,500,000 up to the time of its closing in 1870 (Logan, 1935, p. 184). In 1887 the Mariposa Commercial and Mining Company was organized by San Francisco financiers Hayward, Flood, et al., but nothing was done with the Mariposa mine until 1897 when the company was reorganized by another San Francisco group headed by Fred Bradley. Work of rehabilitating and re-equipping the mine began in September 1899 and was completed in 1900, with William Dodge as foreman and F. T. MacGuire as resident manager. From December 1900 to the end of 1915, when mining was halted by adverse wartime conditions, the mine produced a total of 112,379 tons of ore yielding $693,205—an average of $6.17 per ton at the former price of gold. A new inclined shaft was sunk to a depth of 1550 feet (measured along the incline) and several thousand feet of drifts was run. In 1927 the State Highway Commission produced 35,000 tons of crushed rock of unannounced value from dumps at the Mariposa mine. Between 1927 and 1932 lessees worked the extension of the Mariposa vein, taking out about 1500 tons of low-grade ore and several small high-grade pockets. F. E. Gallagher reactivated and re-equipped the Mariposa mine in 1952 and intermittently produced small tonnages of ore mined during cleanout and development work. By July 1955, the main shaft had been unwatered and cleaned out to a depth of 800 feet and a new 100-150-ton-per-day-capacity mill put into operation. The death of Mr. Gallagher early in 1956 suspended activities at the mine. The Mariposa mine has been among the five most productive in Mariposa County, known production to date aggregating $2,395,405.

The Mariposa vein east of the main shaft strikes N. 70° W. and dips 60-70° SW. Between the main and old shafts the vein branches with one branch striking off at N. 50° W. Vein widths vary from 2 to 8 feet wide east of the junction line of the two branches. The branches do not average much greater than 2 feet wide. Vein matter is milky quartz, commonly ribboned toward the borders by thin inclusions of wall rock, with native gold, pyrite and arsenopyrite (Browne, 1868, p. 28). According to Browne there are high-grade pockets in the branch veins that nearly always contain arsenopyrite. He reported two pockets from which $30,000 and $15,000 was obtained. East of the vein intersection the vein matter uniformly contained gold and ore shoots are ill-defined. Several theories of vein structure are discussed by Julihn and Horton (1940, p. 155-157).

Workings of the Mariposa mine include the old, now unusable, shaft 475 feet deep, located 350 feet west of the main shaft, and the three-compartment main shaft 1550 feet deep (measured along the incline) sunk in the 1900's. It has 8 levels with drifts as follows (Laizure, 1928, p. 99).

Level	*East*	*West*
275	390	400
475	400	637
625	700	600
800	322	410
970	396	412
1200	250	400
1400	60	50
1550	200	130

Most of the ore has been stoped out above the 800-level and there are a number of raises and crosscuts as well as a drainage tunnel. A diagram of the workings may be seen in the accompanying figure.

The mine is equipped with a 100-150-ton-per-day mill including jaw-crusher, bank of five stamps, ball mill, jig, Knudsen bowl, amalgamating barrel, and rake classifier. Mill heads run from $8 to $15 per ton, mostly in free gold. Pyrite concentrate runs $60 per ton.

Mary Harrison Group. Location: Secs. 3, 10, 11, T. 3 S., R. 16 E., M. D., 1 mile south of Coulterville on Highway 49. Ownership: Walter J. Lautenschlager, 626 South Catalina St., Los Angeles 5, California, owns 6 patented claims, the Balance, Choteau, Dahlia, Ely, Sheridan and Venture, and several mill sites totaling nearly 80 acres.

The history of the Mary Harrison group of mines closely parallels that of the Malvina group, the two groups being operated for many years by the same company. Discovered about 1852, the mine was operated by the French Company, also known as the Maxwell Creek Mining Company, through the early years of its development. F. L. A. Pioche was the principal owner (Goodyear, 1888, p. 346) in this company. In 1867 the claims on the Mary Harrison vein were sold to Douglass, Chamberlain and Company of San Francisco. By August 1878 the old inclined shaft on the Mary Harrison claim was down 450 feet (Min. and Sci. Press, vol. 33, No. 14, p. 221; Browne, 1868, p. 34). Later that year the mine was sold by the Douglass interests to

Seth Cook and Company. About November 1894, the Merced Gold Mining Company took over the Cook Estate mines and for the next 2 years did extensive development work on the Mary Harrison group of claims. The Merced Company discontinued work on other claims on the Mary Harrison and Malvina veins in 1897 and from that year to 1904 the Mary Harrison mine was the sole producer for the company. According to the historical marker now at the site of the old boiler house the Mary Harrison mine produced $1,500,000 from ore averaging $7 to $12 per ton at the old price of $20.67 per ounce. According to Logan (1935, p. 185) between $330,000 and $400,000 was produced between 1895 and 1903, mill returns in 1897 being $5 per ton. Milling was done at the Potosi mill throughout most of the history of the mine, ore being hauled to the mill over narrow-gauge railroad by steam locomotive. D. G. Kidder, later Mariposa County Assessor, was the last superintendent. A little development work was done on the Mary Harrison mine in 1911 by H. P. Daulton of Alameda but there was no recorded production. Sometime prior to 1920 the Merced Gold Mining Company was dissolved and although the properties have since passed through numerous ownerships no further mining has been done. All buildings were destroyed by fire in August 1926 (Laizure, 1928, p. 100).

The Mary Harrison vein is part of a well-defined system belonging to the main or east vein of the Mother Lode. It is clearly traceable from the county line on the north to the Virginia mine on the south, after which its character is less well-defined. Cross sections of the vein are well exposed in road cuts along Highway 49. The general strike of the vein is N. 50° W. with dips from 60-75° NE. It is characterized by a prominent, massive sheet of milky quartz 4 to 20 feet thick between irregular, ribboned masses of quartz-mariposite-ankerite-pyrite rock. Because of decomposition of pyrite with formation of sulfuric acid groundwater the upper parts of the quartz-ankerite-mariposite-pyrite rock are commonly converted to porous, earthy masses of yellowish brown oxides of iron and silica. Some of the high-grade ore was taken from this sort of vein matter but other similar material proved of very low grade. Adjacent to the vein, wall rocks, which are chiefly slate, serpentine and greenstone, have been impregnated with pyrite in large irregular patches, but such material was evidently too low in gold content to constitute ore. The entire width of vein matter varies from 50 to more than 100 feet wide and there are extensive horses of schistose serpentine caught in the vein matter. Along most of the length of the Mary Harrison claim the hanging wall side generally consists of black slate and schist assigned to the Paleozoic Calvareas formation (group) by Turner and Ransome (1895, maps). The footwall side is serpentine along much of the length of the vein on the Mary Harrison claim but sheets of black slate and greenstone are in contact with it at some points farther north. The greenstone appears to be derived from pyroxene andesite of Upper Jurassic age and the footwall slate is probably part of the Upper Jurassic Mariposa formation. The vein occupies a profound thrust-fault fissure along which there has been displacement aggregating many thousands of feet.

The most extensive ore shoot was encountered on the footwall side of the central quartz sheet. It had a strike length of 300 or more feet and was stoped chiefly between the 400 and 700 foot levels. The vein width embraced by the shoot varied from 3 to 10 feet. Ore was not obtained from the central sheet of massive quartz but some ore was found on the hanging-wall side of the quartz sheet. Large areas of quartz-ankerite-mariposite rock are barren of values and the bulk of the vein matter was too low grade to mill. North of the Mary Harrison group of claims vein matter reaches a width of 300 feet. Although occasional pockets of high-grade ore were found that touched off stories of high-grading activity (various issues of *Mining and Scientific Press*) most of the ore was of milling grade and yielded $5 to $12 per ton at the old price of gold. There is no indication of the probable quantity of ore left in the lower levels of the mine.

Principal workings are a 1200-foot vertical shaft, the most northerly, with levels at 100-foot intervals, a second inclined shaft, also with levels at 100-foot intervals and an airshaft of unknown depth. These shafts are within 250-300 feet of each other in a nearly straight line, and are open to depths of several hundred feet. According to Logan (1935, p. 185) there are more than 5000 feet of drifts. None of the shafts are timbered nor are they accessible without hoisting equipment. There are numerous other workings of unknown extent on the Dahlia, Venture, Ely and Choteau and Sheridan claims but these are largely caved and inaccessible. There has been no recent activity on any of the claims.

Mexican I Mine. Location: NE$\frac{1}{4}$ sec. 23, S.E. $\frac{1}{4}$, sec. 28, T. 4 S., R. 17 E., 1$\frac{1}{2}$ mi. south of Bear Valley. Ownership: Not determined; probably Ellen T. Simpson, et al.

The Mexican mine was discovered sometime during the 1850s and was worked by Mexicans up to the time Fremont gained undisputed title to Las Mariposas grant in 1859. Over $50,000 is supposed to have been taken from a shallow pit prior to the time ownership passed into Fremont's hands (Julihn and Horton, 1940, p. 130). In 1908 a pocket containing $62 was taken out and a 150-foot shaft was sunk (Mariposa Mining and Commercial Company records). In 1934 the mine passed into control of Hickman and Dolman but little or no work was done on the Mexican mine by the company. Between 1934 and 1940 water for the Dolman mill was pumped from the shaft of the Mexican mine.

Striking N. 35° W. and dipping 70° NE., the Mexican vein follows the approximate contact between slate of the Upper Jurassic Mariposa formation and pyroxene andesite greenstone of probable Upper Jurassic age. Greenstone forms the west or footwall side of the vein and slate the hanging wall side. The vein system is discontinuous and is made up of a series of subparallel members and intersecting cutter veins. The upper part of the vein apparently contained pockets of high-grade ore formed by oxidation and removal of valueless sulfide minerals. There is little indication that rich ore was found at depth, but the vein was never thoroughly explored because of the large amount of water to be dealt with in the workings.

Mockingbird (Talc, Lacy) Mine. Location: Sec. 27, 4 S., 18 E., M. D., 1 mile south of Colorado School and 5$\frac{1}{2}$ airline miles northeast of Mariposa. Accessible by 4 miles of good dirt road from Summit Inn on Highway 140. Ownership: David W. and Maxie S. Dukes, 612 Blackburn, Watsonville, California own 1 patented claim of 20 acres.

The Mockingbird mine, known prior to 1900 under the names Tale and Lacy, was discovered sometime prior to 1890. It is characteristically a pocket mine noted for specimens of wiry and arborescent gold (Preston, 1890, p. 304). Through the 1890s it was operated principally by George Lacy of Mariposa (Storms, 1896, p. 219). In the early 1900s the property passed into the hands of J. A. and C. J. Schroeder of Mariposa and remained in the Schroeder family until the 1950s. No work has been done on the property in recent years. Much of the work on the mine was done by the Weston Brothers prior to 1920 (Castello, 1921, p. 126).

Gold occurs at the borders of a nearly vertical, chloritic, altered greenstone dike which strikes N. 40-45° W. More precisely it occurs where gently dipping quartz stringers cutting the dike contact the slate wall-rocks (Preston, 1890, p. 304). The altered dike, averaging approximately 3 feet wide, consists in most places of a talcose, chloritic, clayey mass including quartz stringers a fraction of an inch to several inches wide. During the early years of mining the gold was sluiced or hydraulicked.

According to Castello (1921, p. 126) there is also a northwest-trending quartz vein containing free-milling ore. He describes a shaft 100 feet deep with drifts and a tunnel several hundred feet long. The property was not visited during this investigation.

Mount Buckingham (Vanderbilt, Sunset III, Crown Point) Group. Location: Secs. 1, 2, 11, 12, T. 5 S., R. 19 E., M.D., near the southeast end of Mount Buckingham above Snow Creek, 1 mile west of Darrah. Ownership: Helen M. Ketler et al., 3325 Kempton Ave., Oakland, California owns one patented mining claim, the Vanderbilt and about 300 additional acres of patented mining and timber land.

The Mount Buckingham group of mines was first located by William Buckingham in 1850 (Castello, 1921, p. 127). Prior to 1869 an 8-stamp, water-powered mill was built near the mine (Min. and Sci. Press, vol. 18, no. 6, p. 86, 1869). In April 1871 George Bernhard completed an 80-foot tunnel that exposed a 2-foot vein showing free gold. In 1883 a crosscut adit was started that had reached a length of 400 feet by 1885 (Min. and Sci. Press, vol. 46, no. 13, p. 221, vol. 50, no. 26, p. 416). Hall and Starr were the owners in the early 1880s. Ore was described as running $10 to $15 per ton. By 1889, ownership had passed to a man named MacDonald who is reported to have recovered $2,000 in one cleanup, representing 20 days of milling (Min. and Sci. Press, vol. 58, no. 13, p. 234). In 1893 Judge Condon of Mariposa was listed as superintendent but the mine was largely idle that year. In 1894 the mine was owned by a partnership in which George Beebe was the principal partner. In 1895, W. S. Chapman, of the Hite mine, purchased an interest in the Mount Buckingham and the Sunset Mining Company was organized with George Beebe acting as superintendent. A new 10-stamp mill was built on Snow Creek half a mile east of the mine (Storms, 1896, p. 224). By 1904 ownership had passed to Mrs. Eliza J. Starr of San Francisco (Wilkinson, 1904, p. 13). In 1916 a landslide damaged the adit and buried 200 tons of ore lying on the dump. From about 1912 to 1916 the mine was intermittently operated by the Mt. Buckingham Gold Mining Company of Mariposa, J. L. Diven of Mariposa, superintendent during much of this period (Lowell, 1916, p. 589). By 1920 ownership had passed to J. L. Diven and Mrs. C. A. Morgan but by 1928 Mr. Diven was listed as sole owner (Castello, 1921, p. 128; Laizure, 1928, p. 102). The properties apparently were idle during the 1920s but were operated for a short time in 1930-31, producing a small tonnage of ore running slightly less than 0.2 oz. of gold per ton. There has been no recent work done on the mine and there is little record indicating the total production.

Five more or less parallel quartz veins have a general northwest strike and dip southwest at angles between 70 and 85 degrees. Vein widths vary from 2 to 25 feet. One of the veins is accompanied by a granitic dike in which gold has been deposited. Others associated with granitic dikes are relatively barren of gold. The veins cut a roof-pendant of chiastolite-mica schist, most of the surrounding rock being granitic. Vein matter consists of glassy and milky quartz, ore shoots carrying abundant pyrite as well as some native gold. Much of the ore milled in the 1880s returned from $12 to $15 per ton with pyrite concentrates running as high as $900 per ton. Most of the ore encountered in later development work was considerably lower in grade, much of it running only $3 to $4 per ton. Ore mined in 1930-31, totaling 252 tons, averaged about 0.2 oz. of gold and 0.2 oz. of silver per ton.

The principal working is a 500-foot crosscut tunnel with a connecting 250-foot raise, 30-foot winze and 2 large stopes. There are several open pits and minor workings.

Mount Gaines (Barfield, Frenchman, Bearfield) Mine. Location: Secs. 35, 36, T. 4 S., R. 16 E., M.D., on a tributary to Burns Creek 4½ airline miles northeast of Hornitos. Accessible via 5½ miles of the surfaced Hornitos-Bear Valley road. Ownership: J. W. Radil, 444 California St., San Francisco, Calif., owns over 300 acres of patented mining and agricultural land.

The first mining done in the vicinity of the Mount Gaines properties was placering of Burns and Eldorado Creeks carried on from 1853 to 1873 (Julihn and Horton, 1940, p. 122). Lode mining began about 1868 on pockets and narrow stringers, vein matter being crushed in arrastras. In the early 1870s a 400-foot vertical shaft was sunk on the Frenchman claim about 2000 feet northeast of the present main shaft. These workings yielded about $100,000 according to Julihn and Horton (1940, p. 122). These authors state that ''beginning in 1880, three successive mills were built on the Mount Gaines property, two having been destroyed by fire and the third by flood.'' Shallow surface workings supplied most of the ore crushed in these mills, but $150,000 was recovered from ore mined on the Barfield (also called Bearfield) claim. About 1881 the Mount Gaines mine was purchased, along with a large group of mines in the vicinity of the Number Nine mine, by the Yosemite Mining Company in which M. Huling, a Pennsylvania oil man was the chief owner (Mining and Scientific Press, several entries, 1881). Four thousand dollars was reported as the purchase price. This company operated the mine intermittently or leased it to various groups until about 1904 when it was sold to the Consolidated Mining and Processing Company of Los Angeles, W. T. Carter, secretary. Prior to this sale in 1904 considerable ore had been milled from the Barfield claim.

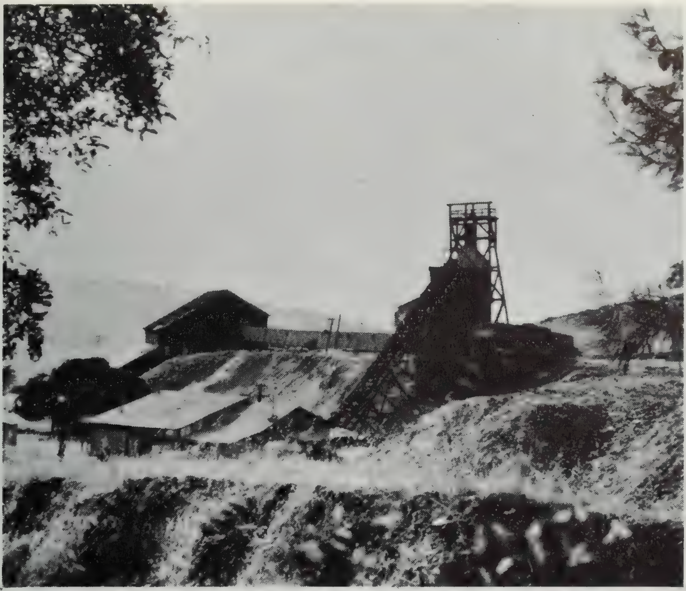

FIGURE 29. Mine installations at the Mount Gaines mine in the Hornitos district, observer facing northwest. The Mount Gaines mine has an estimated production of $3,590,000, mostly in sulfide ore running $18-$20 per ton in gold.

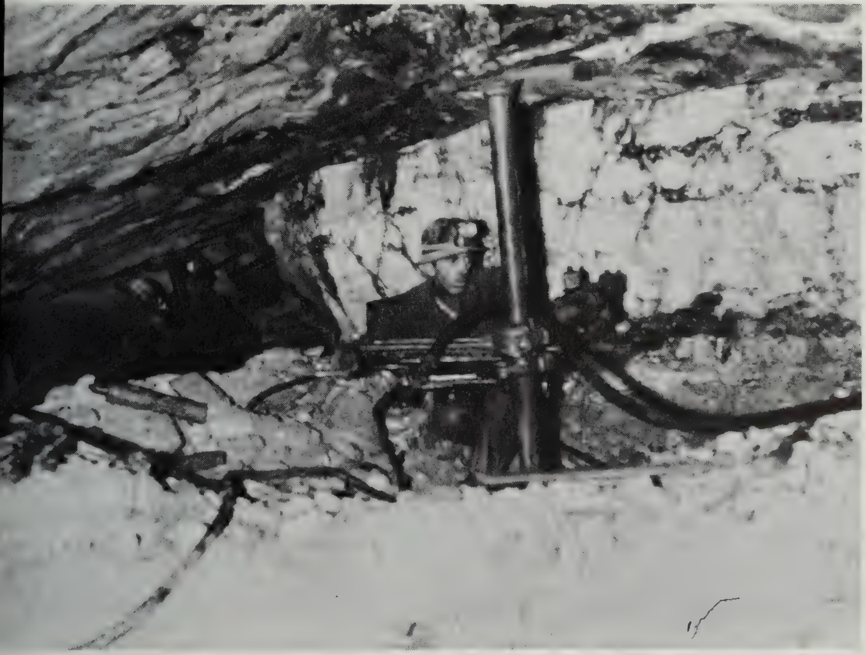

FIGURE 30. The Mount Gaines vein as exposed in the "I" stope 50 feet above the 00-level. The width of the vein is about 4 feet. The very shallow dip of the vein nd the schistose character of the greenstone wall rocks are clearly shown. *Photo by ourtesy of Francis H. Frederick.*

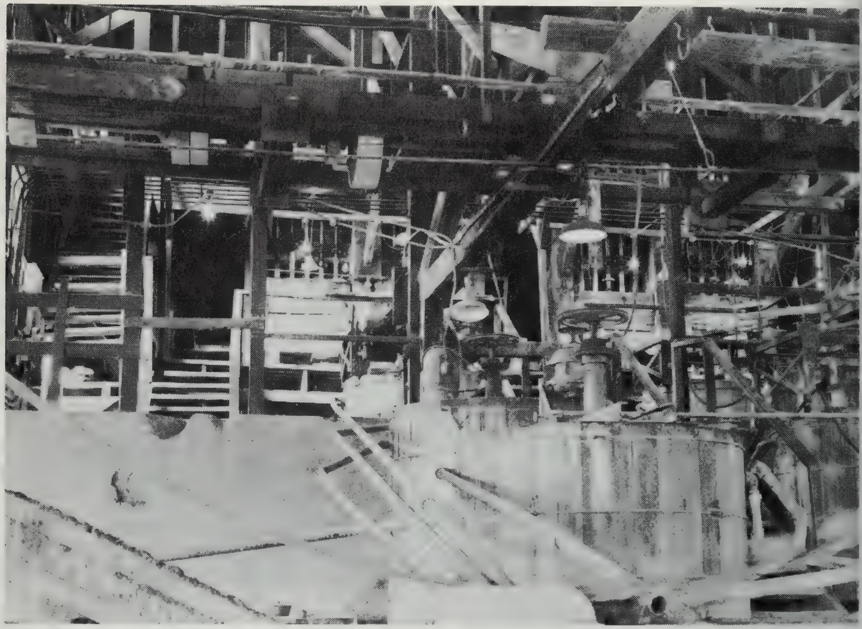

FIGURE 31. Part of the Mount Gaines mill as it was in the spring of 1941, showing several banks of stamps and three flotation units. *Photo by courtesy of Francis H. Frederick.*

The main shaft, started by the Yosemite Company in 1881 was down 300 feet by 1897. At that depth the vein was reported to be 5 feet wide and the ore to average $25 per ton. The Consolidated Mining and Processing Company failed to get the mine into production and after a period of inactivity of nearly 3 years the Mount Gaines Mining Company was organized in 1906 with A. R. Gaines of Los Angeles as the principal owner and manager. Under this management, which operated the property until 1911, the shaft was deepened to 1322 feet and many thousands of feet of drifts were run. Mine production from 1900 to 1911 totaled nearly $1,000,000 (Julihn and Horton, 1940, p. 122). Operations by this company ended in indebtedness and litigation in 1911. In April 1914, a group of Denver and Los Angeles men headed by A. M. Gillespie attempted to reopen the mine but was unsuccessful. About 1917 another company, the Mount Gaines Gold Mining Company, was organized with G. W. Crotts and Serona E. Crotts as principal owners and W. J. McCray as superintendent. Considerable expenditure was made for equipment but indebtedness and litigation hampered the various managements and no material mining was accomplished during the 1920s.

In May 1934 the mine was leased to International Mining and Milling Company of Los Angeles and soon was put into operation under the direction of Nelson L. Wagner. This company went bankrupt in 1939 with the Mount Gaines mine its only productive and profitable asset. From 1939 to 1949 the mine was operated under the control of the Federal Bankruptcy Courts, Mr. J. P. Hart of Reno, Nevada acting as operating trustee. A. V. Udell was manager part of this time and later

John L. Dynan. The operating profits from the mine for that 10-year period were substantial and were used to pay the very high litigation costs connected with the various bankruptcy claims and procedures. Mine development was kept at a minimum during that period and it was largely through lack of development that the mine ceased to be profitable. A small production was recorded in 1951-52 in a mill cleanup but the mine was idle until 1956 when the present owner began exploration and development works.

Although production records are not complete the gross production of the Mount Gaines mine is estimated to be at least $3,590,000. From 1932 to 1947 the ore averaged more than half an ounce of gold per ton in addition to substantial quantities of silver, copper and lead, giving an average of approximately $19.79 per ton. The Mount Gaines mine ranges among the 5 most productive mines in Mariposa County.

The Mount Gaines mine is on a northeast-trending vein system that at the surface is not very well defined. Much of the early work on the veins was done on pockets and stringers of sulfide-bearing quartz and the main branch of the vein system was discovered at depth. In the main vein, which is sinuous, the best ore tends to be concentrated on the east sides of arcuate irregularities, particularly along the parts of the vein having the gentlest dip. (Frederick, Francis H., personal communication, 1956). Shoot lengths vary from 40 feet to 450 feet long. The main vein strikes about N. 35° E. and dips southeast at an average dip of 20°, but dips vary from 10° to 30°. The vein system has a known length of about 9000 feet and has been developed for a strike length of more than 2000 feet and a depth of over 1300 feet, measured on the incline. It varies from a few inches to more than 15 feet wide averaging about 5 feet wide. Vein matter is chiefly milky quartz, but some ore occurs in quartz veinlets in fractured, slaty to chloritic green-

HORNITOS
SALOON
R.W. BARCROFT
PROP.

FIGURE 32. A gathering of mining men in front of Hornitos saloon, photo taken about 1895. Standing, left to right, Messrs. Henry Nelson, Smith Thomas, John Branson, Dennis (?), B. A Sheppard, G. Gagliardo, J. D. Craigham, and Mose Rodgers. Seated, left to right, Messrs. R. Bancroft, Al Sylvester, Collier (?), J. Spagnoli, Bailey, Tom Thorne, Robert Arthur, and Tom Williams (?). *Photo by courtesy of Francis H. Frederick.*

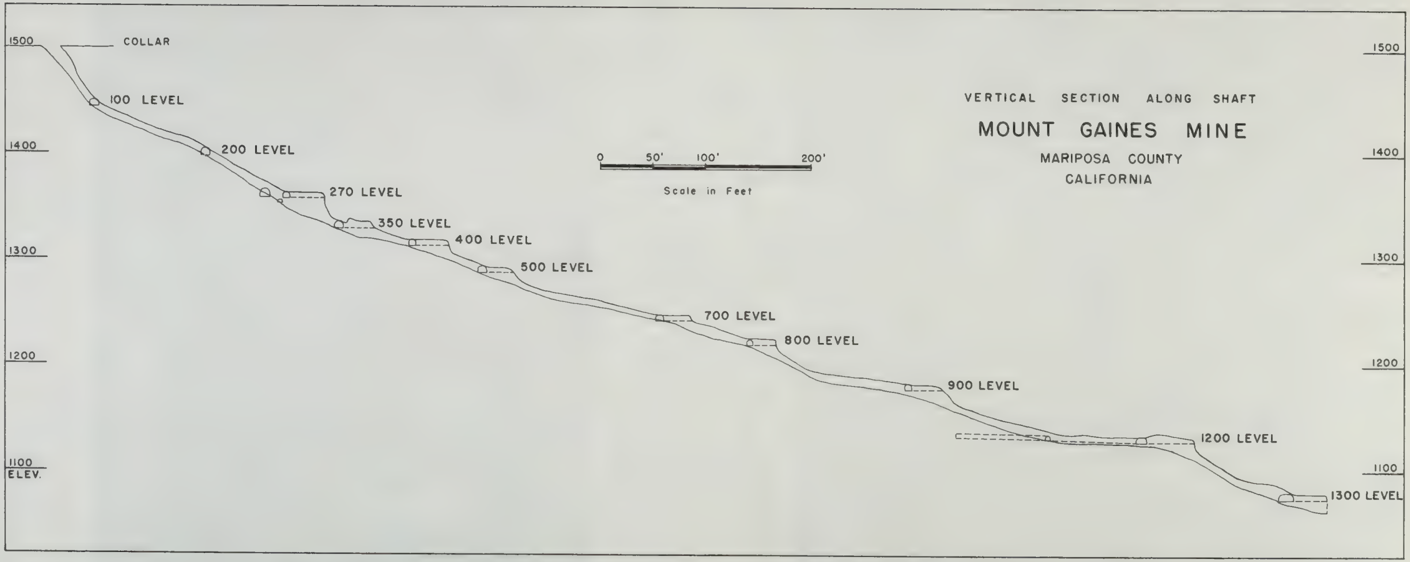
VERTICAL SECTION ALONG SHAFT
MOUNT GAINES MINE
MARIPOSA COUNTY
CALIFORNIA
0 50' 100' 200'
Scale in Feet
1500
1400
1300
1200
1100
ELEV.
COLLAR
100 LEVEL
200 LEVEL
270 LEVEL
350 LEVEL
400 LEVEL
500 LEVEL
700 LEVEL
800 LEVEL
900 LEVEL
1200 LEVEL
1300 LEVEL

FIGURE 33. Vertical section along shaft, Mount Gaines mine. *Courtesy of J. W. Radil.*

stone along the footwall. Ore shoots contain about 3 percent sulfides. Ore minerals include native gold, galena, sphalerite, chalcopyrite, pyrite, arsenopyrite, barite, proustite and argentite, according to Julihn and Horton (1940, p. 123). Deposition of pyrite preceded that of galena; sphalerite and gold were deposited later than the pyrite. No high-grade ore was observed on the dump at the time of the authors' visit in September 1954. Wall rocks are chiefly massive pyroxene-andesite greenstone belonging to the Peñon Blanco member of the Upper Jurassic Amador group, but there are some slaty and horfelsic metasediments in the section. Shearing and hydrothermal alteration along the vein have caused widespread development of schistose, chloritic, slate-like material, particularly on the footwall side of the vein. Hornblende granodiorite dikes apparently have penetrated the vein fissure in many places as there is considerable material of this kind on the dumps. Julihn and Horton (1940, p. 122) describe a prominent dike on the hanging wall side of the main vein.

The disposition of the principal workings may be seen in the accompanying diagrams. The main inclined shaft is 1322 feet long, measured on the incline, and has 13 drift levels at 200, 270, 350, 400, 500, 600, 700, 800, 900, 1000, 1050, 1100 and 1200 feet. There are more than 11,000 feet of drifts and 1200 feet of raises. The principal development has been northeast of the main shaft. There is also a tunnel driven N. 20° E. which was not accessible in September 1954. The main shaft and workings were watered within 20 feet of the collar of the shaft. The mill and hoisting equipment were partly dismantled and rehabilitation of mine and buildings will require considerable capital outlay.

Mount Ophir. Location: Sec. 12, T. 5 S., R. 18 E., M.D., 1 mile northwest of Mount Bullion close to the south side of Highway 49. Ownership: Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa, California, owns a large tract of land, a portion of the old Las Mariposas Grant, which includes the Mount Ophir, Louis, Mountain View and Greens Gulch mines.

The Mount Ophir mine is one the most accessible and conspicuous of the Mother Lode mines in Mariposa County. Massive white quartz of the Mother Lode crowning the summit of Mount Ophir makes a prominent landmark along Highway 49. Close by are the ruins of the Mount Ophir mint which manufactured octagonal gold slugs from locally mined gold in 1850-51. Discovered in 1849 or 1850, it was worked extensively up to the time Fremont gained title to Las Mariposas Grant in 1859 and intermittently thereafter until 1914. Three months of operation in 1860 grossed $43,000 from 1845 tons of ore for an average of $23.20 per ton (Julihn and Horton, 1940, p. 112). Browne (1868, p. 29) states that the yield in 1864 was $12,540. From 1864 to 1901 little or no work was done on the mine. The reorganized Mariposa Commercial and Mining Company, which took over the Las Mariposas Grant in 1897, reactivated the property in 1901. Between that year and 1914 a total of 2366 tons of ore was mined which yielded $29,252.75 or an average of $12.37 per ton at the old price of gold. Although the mine was examined by George R. Barnett of San Francisco in 1935, under option to purchase, and although available records indicate that the mine was not worked out, there has been no production since 1914. The estimated total production of the Mount Ophir mine is between $250,000 and $300,000 (Julihn and Horton, 1940, p. 112) but the recorded production is $85,703.

At the Mount Ophir workings, the Mother Lode strikes N. 55-60° W. and dips 55-65° NE. Vein matter crowning the hill is at least 30 feet wide. According to Lowell (1916, p. 590) the vein averaged 5 feet wide in the workings. Only stringers are visible in the lower tunnel which has been driven at the contact of schists of the Paleozoic Calaveras group, which forms the hanging wall, and serpentine which forms the footwall. Both of these units have come in along a fault-zone cutting the Mariposa slate. Veinlets of quartz penetrate the serpentine walls and locally form stockworks. There is very little mariposite-ankerite rock in this segment of the Mother Lode system. Ore shoots apparently are confined to the footwall and hanging wall sides of the vein, the central milky quartz being relatively barren of ore minerals. The larger ore shoots apparently were concentrated on the footwall side. One pocket of ore was found in a vein on the footwall side of the main vein in 1913 that yielded $711.65 (Laizure, 1928, p. 98). Ore mined in the early days apparently averaged a little better than $23 per ton whereas ore mined in the 1900's averaged a little over $12 per ton, both these figures at the old price of gold. According to a report made in 1922 by Frank Eichelberger (Julihn and Horton, 1940, p. 112) the workings at that time contained 4000 to 5000 tons of developed ore averaging 4 feet wide that would mill $9 to $11 per ton. He further stated that nearly all the development work had been carried on on the footwall side of the vein with little or no exploration of the hanging wall side.

Principal workings are two adits, one about 115 feet above the other, both driven on the vein from the north side of the hill. The lower tunnel, 700 feet long, reaches a vertical depth of 250 feet below the top of Mount Ophir. This tunnel was accessible in August 1955 although in need of cleaning out. The upper adit is 320 feet long but is partly caved. A third adit, mentioned by Lowell (1916, p. 591) could not be located and presumably is caved. At the summit of Mount Ophir are two open stopes or air shafts each at least 100 feet deep which could easily be cleaned out as accessways. According to Lowell, there were 1500 feet of drifts, 360 feet of raises, 80 feet of crosscuts and one large stope in 1916.

Mountain King (Omparisa, Calender and Calendonia) Mine. Location: Sec. 31, T. 3 S., R. 18 E. and sec. 6, T. 4 S., R. 18 E., M.D., on the north side of the Merced River Canyon 1 mile east of Quartz Mountain and 6 airline miles east of Bagby. Accessible by 5½ miles of good dirt road from Briceburg on Highway 140. Ownership: 13 of the claims are owned by J. W. Radil, 444 California St., San Francisco 4, California and 5 claims are owned by Ralph E. Dailey, 1165 Twenty-second St., Merced, California.

Very little concerning the early history of the Mountain King mine has been recorded. It was being developed in 1899 by Egenhoff and Merritt who were running a tunnel designed to tap the vein 1500 feet from the surface. In 1904 the properties were bonded to the Omparisa

Mining Company headed by H. C. Austin for $40,000. (Min. and Sci. Press, vol. 88, no. 12, p. 122, 1904). H. A. Kunz was one of the first superintendents under this company which started a crosscut tunnel to intersect the 5 parallel veins cropping out higher on the hill. A 5-stamp mill was completed in March 1905 and this was increased to 10 stamps in October the same year. Several high-grade ore-shoots were found in 1909 and the mill was increased to 20 and then to 40 stamps. William S. Thompson was superintendent 1910-1911. After a short period of inactivity the Mountain King Mining Company was organized in 1914 and took over the holdings of the older company. Alexander Hamilton was superintendent in 1915 and B. C. Austin in 1917. Operations by this company ceased in 1922 because operating costs rose above mill returns. The mine has been idle ever since except for a little leasing activity between 1922 and 1925.

From 1909 to 1925 the mine produced 162,800 tons of ore yielding 39,833.51 oz. of gold and 18,042 oz. of silver for a total of $825,425.65 and an average value per ton of $4.51 (at the former price of gold). Estimated total production of the mine is nearly $1,000,000.

Five persistent veins as well as a number of smaller ones cross the Mountain King properties at the surface. Four of the 5 main veins have been identified in underground workings and a fifth was discovered during development work that does not reach the surface. The principal veins are the Mountain King, Flat O1, Back or No. 3, McFadden and Big Flat Footwall. Production thus far has come only from the Mountain King and Flat O1 veins. The McFadden, Mountain King and No. 3 veins are roughly parallel, strike N. 20-25° W. and dip 65-80° N.E. The Big Flat Footwall vein strikes southwest and dips northwest. The Flat O1 vein appears to diverge from the steeper Mountain King vein about 800 feet from the surface at about the 200-level. The best grade of ore taken from the Mountain King mine came from between the 200- and 300- levels of the Flat O1 vein during the period 1910-12.

Three ore shoots, numbered 1 to 3, east to west have been found and worked in the Mountain King vein. The No. 1 oreshoot is known to extend from the surface, at the collar of the Egenhoff shaft to a known inclined depth of 1000 feet and was still well defined at that depth when abandoned to work the No. 2 shaft. The No. 2 shoot has been explored between the 850- and 2000-levels where it is known to merge with the No. 1 shoot near the 2000-level. The No. 2 shoot is 200 feet long, averages 46 inches thick on the 2000-level and averages $9 per ton at the present price of gold. The third and most westerly ore shoot dies out above the 850-foot level but is still well defined near the bottom of the workings on the 2000-level.

Mountain View I Mine. Location: Sec. 11, T. 5 S., R. 17 E., 2 airline miles northwest of Mt. Bullion. Adjoins the Louis mine. Accessible by unimproved dirt road from Greens Gulch via the Louis mine. Ownership: the mine is part of a tract of land containing several hundred acres, part of Las Mariposas Grant, still held by Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa, California.

The Mountain View mine was discovered prior to 1859 and its history has been similar to many other Las Mariposas Grant mines. It apparently was characteristically a pocket mine or at least had small ore shoots, and most of the recorded production has been from ore of fairly high grade. One of the principal periods of production was 1900-1915 when 376.16 tons of ore mined yielded $17,792 or an average of $47.52 per ton at the old price of gold. No other production records are available. No mining has been done since 1915.

Both the Mountain View and Louis properties are crossed by the same vein, which is generally considered to be part of the Mother Lode system. This vein is roughly parallel and en echelon to the vein passing through the Mount Ophir mine, the two veins being about 3200 feet apart. Crossing the Mountain View claim the main vein strikes N. 48° W. veering to about N. 65° W. crossing the Louis property. The dip is 60-65° northeast and average width is about 2½ feet. Wall rocks are black slate of the Upper Jurassic Mariposa formation. Strike of the slaty cleavage is roughly parallel to the strike of the vein. Vein matter is milky quartz with pyrite and native gold. Inclusions of thin sheets of slate give a ribbon-like structure to some parts of the vein.

Workings consist of 2 adits driven on the vein totaling about 500 feet, 400 feet of crosscuts, 160 feet of raises and a stope 50 feet long and 100 feet high (Lowell, 1916, p. 591). Milling was done at the Princeton mill throughout the last period of operation of the Mountain View mine.

Nellie Kaho. Location: Sec. 4, T. 5 S., R. 17 E., sec. 33, T. 4 S., R. 17 E., M.D., 3 miles south of Bear Valley and just west of Cow and Calf Road. Ownership: Harold Hansen, Mariposa, California, owns a property consisting of about 20 acres. Under lease (1956) to Harmon and Gault.

Prior to the late 1930s the Nellie Kaho mine was one of many old prospects which had never been well explored. Taken over by a group of leasers including the present owner, in June 1937, about $1400 was recovered from surface workings (Julihn and Horton, 1940, p. 126). By 1938 a 100-foot shaft had been sunk which connected with a 50-foot south drift and a 50-foot east crosscut on the 100-level. The advent of World War II ended this period of operation. Clyde Diffenbaugh of Bear Valley did some work on the mine in 1951-52 and the present operators have worked the property intermittently since 1954.

The quartz vein, one of the Mother Lode system, is about 18 inches wide and crops out for a distance of 100 feet at the surface. It strikes northwest and dips about 80° SW. Wall rocks are slate and greenstone. Ore runs from ¼ to ½ percent sulfides, 30 percent of the precious metal value coming from the sulfide concentrate. This averages 6 to 7 oz. of gold per ton. The grade of ore mined in the late 1930s ranged between $10 and $20 per ton with occasional pockets of higher-grade ore.

Workings consist of 2 shafts about 50 feet apart. The main shaft, the more southerly, is 200 feet deep and is inclined about 85° W. There is a 50-foot level, a 125-foot level and a 200-level. Recent work has been on the 200 level. The operators plan to ultimately deepen the north shaft, now about 50 feet deep, and connect the 2 workings. In 1938 the workings made 8000 gallons of water per day.

Number Five (Monte Carlo) Mine. Location: Secs. 2, 11, T. 5 S., R. 16 E., M.D., 5 miles northeast of Hornitos and 1 mile northeast of the Number Nine mine. Accessible from the paved Hornitos-Bear Valley road by 1½ miles of good dirt road via either the Number Nine or Mount Gaines mines. Ownership: not determined.

The Number Five mine is an old property consisting of the Number 5 and Jack Quartz claims and the fractional Standby and No. 5 Extension claims. A small production was recorded in 1899, but the operators' names were not recorded. The principal period of activity was 1909-1914, operators being the Number Five Mining Company, J. J. Le Tourneau of Duluth, Minnesota, president and E. S. O'Brien of Merced, secretary. Various superintendents under the management were Hugh Branson (1909), Martin Sutherland (1910) and Carl J. Smith (1911). A 260-foot inclined shaft was sunk with a 300-foot drift on the 100-level and a 56-foot crosscut on the 200-level (Min. and Sci. Press, vol. 99, no. 2, p. 41, 1909). In 1914 the property was operated for a short time under bond by the Nevada Mineral Extraction Company in which S. W. Parker of Berkeley was the principal owner and C. H. Gage was superintendent. A 50-ton Lane mill was installed (Eng. and Min. Jour., vol. 98, no. 20, p. 894, 1914). The mine was operated under lease for a time in 1921-22 and a small production was recorded. No material amount of mining has been done since 1922 and the land has reverted to agricultural status.

There are at least three veins on the Number 5 property, the Number 5, Number 2 and south extension of the Prescott. The Number 5 vein, the most prominent and the most southerly of the group, trends N. 75-80° E. and dips about 65° north. It ranges from 5 to 30 feet wide and consists principally of milky quartz with abundant pyrite. Surface showings of gossan are common. The Number 2 vein, apparently the one crossing the Jack Quartz claim, strikes N. 80-85° E. and dips steeply north. It is much narrower and less well defined at the surface than the Number 5. The southern extension of the Prescott vein apparently has been the most extensively worked. It strikes N. 20-30° E. on the Number 5 property and swings more nearly to the north on the Prescott claim. Ranging between 1 and 4 feet wide, it dips toward the east at angles varying from 20 to 30 degrees and blankets much of the hillside area. Judging from the numerous surficial workings there must have been numerous parallel blanket stringers in addition to the main Prescott vein. All of the soil mantle in the vicinity of the veins has been placered. The veins cut a variety of wall rocks, chiefly slate, spotted slate, schistose greenstone, hornblende schist and hornfelsic slate probably belonging to the Upper Jurassic Amador group (Taliaferro, 1943, p. 282). These are cut in places by irregular intrusions of porphyritic granitic rocks, chiefly granodiorite porphyry.

The main working on the Prescott vein is a long northwest-trending crosscut adit with extensive connecting drifts and stopes. Laizure (1928, p. 104) mentions a main shaft 260 feet deep and a second shaft 200 feet deep but does not state the location of these workings. There are numerous workings on the Prescott vein which could be either shafts or stope openings. All of the workings are in need of cleaning out and those on the Prescott vein are flooded below the main adit level.

Number Nine (Bill Jones and McCall, Yosemite, Ginaca) Mine. Location: Sec. 10, T. 5 S., R. 16 E., M.D., 2 airline miles northeast of Hornitos. Accessible via 1¼ miles of improved dirt road from the paved

Hornitos-Bear Valley road. Ownership: W. R. Plunkett and Ulysses M. Peyrellade, 1278 Twenty-sixth Ave., Oakland, California, own three patented claims totaling about 41 acres.

The Number Nine mine was probably discovered in the 1850s and mined in a small way from surface pits and shallow underground workings. The first owners of record were Major Hardwick and son who reopened the mine 1873 and erected a mill. Prior to erection of the mill in 1873-74 ore was crushed at the Mt. Gaines mill where one run of 2,000 tons yielded $7.375 per ton (Min. and Sci. Press, vol. 29, no. 4, p. 53, 1874). In 1880 the mine was sold along with several others to Marcus and J. W. Hulings of Oil City, Pennsylvania, for $77,000 (Min. and Sci. Press, vol. 41, no. 24, p. 372, 1880). At that time the ore in the mine was sampled and was supposed to average $9 per ton. A 30-stamp mill was erected which crushed 40-45 tons of ore in 24 hours. Only $1-$2 of the total gold proved to be free-milling and the first year of operation proved a failure. In 1881 a new milling procedure, which recovered sulfide concentrates, was introduced and several years of profitable operation ensued in which recovery varied from $6 to $9 per ton and profits from $2-$4 per ton. J. Frank Thorn was superintendent during this period. A $15,000 chlorination plant was erected in 1883 but this evidently was not successful. The mine closed down soon afterward and nothing further was done until 1896 when it was held for a short time by W. S. Chapman and Associates of San Francisco. Ownership had passed to Moses L. Rodgers after the Hulings left. The Chapman management failed to get the mine into production and it lay idle until 1903 when some cleanout, exploration and development work was done by Harmon and Stevens under the direction of W. F. Stevens. About 1909 the Number Nine Gold Mining Company was organized, initially with New York capital but later reorganized by San Franciscans. Richard O'Brien superintended mine operations from 1909 to about 1911. During this time the old inclined shaft was re-timbered to the 250 level and then abandoned. In 1910 a new vertical shaft, the Keys was started which ultimately reached a depth of 140 feet (Laizure, 1928, p. 104). Between 1911 and 1919 there was a little intermittent activity at the property but no sustained mining (James Peck managed the mine for the Rodgers estate). About 1919 the Number Nine Gold Mining Company was reorganized with L. A. Ginaca of San Francisco as president. This company moved in new equipment, unwatered the mine and was preparing to re-open when litigation cancelled further work until 1924. From 1924 to 1930 activity was confined largely to rehabilitation and development work and only a few ore shipments were made. B. S. McArthur was superintendent in 1928. Between 1930 and 1936 there was a moderate production of low-grade ore. There has been no activity since 1936 and all equipment has been removed.

According to Laizure (1928, p. 104) twelve veins have been discovered on the Number Nine property. The main system strikes north to N. 20° W. and dips 25-30° E. It is crossed by a secondary, nearly vertical system of east-trending veins. The most prominent vein crops out on the east side of a low ridge northwest of the Key shaft, blanketing the hillside for perhaps an acre. Most of the early work apparently was done on this vein as a great many shallow workings have been driven into it. Vein matter consists chiefly of massive to vuggy milky quartz 3 to 15 feet thick, with very erratically distributed masses of auriferous pyrite. Wall rocks consist of quartz-biotite schist, gneiss and hornfels with some small intrusions of altered granodiorite. Although not well exposed, some of the ore appears to have developed in altered dike material on the footwall side of the vein. The width of the main vein in the vicinity of the Number 5 shaft varies from 38 to 44 inches. The vein exposed in the drift adit 150 feet from the end was 18 inches wide.

Six shafts and a 350-foot drift adit were identified on the Number Nine property. Four of these shafts are approximately on a line bearing N. 20° W. The most northwesterly of this group is the No. 9 at least 125 feet deep but long unused. The most southeasterly is the No. 5 shaft 387 feet deep measured on the incline. The shaft serves 3 levels of which the 300-level is most extensive. The No. 9 and No. 5 shafts are about 880 feet apart. Two 30-foot deep shafts are about evenly spaced in this interval. All these shafts are inclined from 20° to 28° northeast. The Key vertical shaft is 150 feet deep with the lowest working level at 125 feet. This shaft is located about 500 feet northeast of the Number 5 shaft. The Key Extension shaft, also vertical is located close to the Mount Gaines mine road about 1000 feet north and slightly east of the Key shaft. All of the workings have been inactive for a long time and are in need of rehabilitation.

Nutmeg Mine. Location: Sec. 30, T. 4 S., R. 18 E., M.D., on the west side of Whitlock Creek 1 mile north of the Permit mine and 4 airline miles northeast of Mount Bullion.

Ownership: Sam Le Barry, c/o Permit Mining Company, Midpines, California owns one unpatented claim.

The Nutmeg mine is on a north extension of the vein system that passes through the Milburn, Permit and Geary mines. Little has been recorded of the early history of the mine but it was discovered prior to 1900. A moderate production is recorded from 1938 to 1951, a total of 5239 tons of ore having yielded 1204 oz. of gold, and a little lead and copper, and 331 oz. of silver. The average yield per ton has been between $8 and $8.50 although some pockets of ore run as high as 3 oz. per ton. The mine is still worked intermittently by the Permit Mining Company under the direction of H. H. Odgers.

The main vein is about 3½ feet wide, strikes N. 20-25° W. and dips steeply east. Wall rocks are massive and sheared pyroxene andesite greenstone. Four ore shoots have been developed which average 25 feet long (Julihn and Horton, 1940, p. 152). The principal working is a 106-foot vertical shaft with more than 160 feet of drifts on the 50-foot level and 300 feet on the 100-level.

Oakes and Reese (Grand Prize and Badger) Mine. Location: Secs. 32, 33, T. 3 S., R. 16 E.; sec. 4, T. 4 S., R. 16 E., M.D., in the northwestern part of Hunter Valley 2 miles east of Exchequer reservoir on Temperence Creek. Accessible via the paved Hunter Valley road, 11 miles north and slightly east of Hornitos.

Ownership: W. A. Hayes, Martin S. Heller and J. P. Warren, 1900 Leimert Boulevard, Oakland 2, California own 2 patented claims, the Grand Prize and Badger, totaling 26.15 acres.

The Oakes and Reese mine, discovered in 1863, was one of the famous early producers in Mariposa County. It has produced between $500,000 and $600,000 (Julihn and Horton, 1940, p. 117), most of this total coming from the period 1863-1870. The operator in 1865 was J. W. Adams and Company and in 1870 Robinson and Company. According to Castello (1921, p. 131) the mine was closed down in 1870 because of a lawsuit over water rights and because one of the ore-shoots was mined out. The property was operated under lease in 1870-1871 by Dan Jones (Min. and Sci. Press, several entries). Much of the ore mined in the 1860s ran much higher. Early milling was done in arrastras. A 10-stamp mill was built in 1866 which had been increased to 28 stamps by 1868 (Raymond, 1870, p. 24). The vein had been opened to a depth of 200 feet by 1868 (Min. and Sci. Press, vol. 16, no. 9, p. 134).

Except for intermittent small mining by lessees and occasional development work the mine remained closed until June, 1937. Some work was done in the late 1920s by the Oakes and Reese Mining Company, a New York firm (Laizure, 1928, p. 131). During 1938 a small tonnage of low grade ore was milled by W. A. Hayes of San Francisco, Thomas Henry of Hornitos acting as superintendent. No high-grade pockets were found and the mine shut down in 1939, since when the property has been idle. The shaft was caved, and all equipment removed in July, 1954.

The Oakes and Reese mine is located on a well-developed vein of bluish quartz, called the Blue Lead, that strikes N. 35-40° W. and dips 70-80° northeast. The Blue Lead is intersected, approximately at right angles, by a series of nearly vertical cutter veins or laterals which enter the main vein from the east or hanging wall side, and which in general carry more high-grade ore than the main vein. The two principal laterals, the Potts and Floyd, are approximately 400 feet apart. The main vein averages 4-5 feet wide and the laterals between 1 foot and 2 feet wide. A third lateral vein crosses the Blue Lead about 300 feet south of the Floyd lateral, and there is a fourth still farther south. The Blue Lead has developed on or close to the contact between the Hunter Valley chert beds and massive greenstones, both of Upper Jurassic age. The chert series contains thin-bedded tuffaceous shales and siltstones as well as chert. The principal ore body was a pipe-like shoot of high-grade developed at the junction of the Blue Lead with the Potts lateral. The high-grade ore graded into lower-grade material long the footwall side of the Blue Lead. According to Julihn and Horton (1940, p. 117) the ore from the shoot averaged about 2.5 oz. of gold per ton and the best of it 5 oz. or more.

The main shaft was sunk to an inclined depth of 450 feet at the junction of the Blue Lead with the Potts lateral. From the shaft levels were run at depths of 130, 200, 300 and 450 feet, the total amount of drifting being only about 800 feet (Julihn and Horton, 1940, p. 117). The Blue Lead vein has been stoped for a strike length of 60 feet, north of the shaft, and to a depth of 200 feet. The Potts lateral has been stoped for a length of 282 feet from the shaft on the 130-level and 147 feet on the 300-level (Julihn and Horton, 1940, p. 117).

There are two other shafts 160 and 70 feet deep, respectively, both sunk at the junction points of laterals and the Blue Lead. Drifting from these shafts is much less extensive than from the main shaft. The last work done on the mine in 1938 was the extension of the 200 level from the main shaft south toward the Floyd lateral.

Oro Rico (Peñon Blanco) Mine. Location: Secs. 19, 20, 29, T. 2 S., R. 16 E., M.D., just south of the Tuolumne County line on Highway 49. Ownership: Oro Rico Mines Company, c/o A. D. Vencile, Room 14, 1584 West Washington Blvd., Los Angeles, California, owns the patented Old Judge, South Judge, Little Judge, Peñon Blanco and North Peñon Blanco lode claims and the unpatented Star and Stevenson claims totaling more than 100 acres.

The prominent white quartz ridges cropping out on the Peñon Blanco (White Cliff) are among the best known landmarks along Highway 49. Oro Rico properties cover more than 2 miles of the Mother Lode between the county line and Coulterville. Because of its prominence, the vein was one of the earliest to be worked in Mariposa County. The Peñon Blanco claim, over 5800 feet long, is the longest on record. As early as 1868 there were two shafts and several tunnels (Browne, 1868, p. 35) and several ore shoots 2 to 4 feet thick had been discovered. At that time the ore averaged $10-12 per ton. The first application for patent was made by the Oro Rico (Peñon Blanco) mine under the act of 1866, according to Browne. By 1896 there were well over 1400 feet of workings on the property, then owned by A. H. Ward of Alameda (Storms, 1896, pp. 221-222). Ward built a 20-stamp mill and worked various parts of the property until about 1910 when it was bonded to J. C. Wilson and associates of San Francisco (Eng. and Min. Jour., vol. 89, no. 16, p. 839), who did some work on the mine between 1910 and 1912. The property was tied up for much of the time between 1912 and 1928 because of litigation, and little or no mining was done. During this period ownership passed to A. E. Tower of San Francisco. In 1934, J. C. Kempvanee and associates unwatered the mine and did some exploration and development work but little or no work has been done since that time. The total production, although incompletely recorded, is small.

The Mother Lode, as it crosses the Oro Rico property, consists of a single massive vein striking N. 30° W., dipping 52° northeast, and reaching a thickness of over 250 feet. It is intersected in several places by small lateral veins. Great thicknesses of vein matter consist of quartz-ankerite-mariposite rock although the included quartz lenses that cap the ridges are by far the most conspicuous parts of the vein. Over much of the vein length the ankeritic portions have been altered by acid groundwater to spongy masses of iron oxide and silica boxwork. Ore shoots contain pyrite, chalcopyrite and native gold (Storms, 1896, p. 221). Toward the southern end of the mine property the Mother Lode lies close to the contact between slate of the Upper Jurassic Mariposa formation and serpentine, also of Upper Jurassic age. Farther north it is wholly within a large serpentine mass.

In comparison with the size of the vein the ore shoots in this segment of the Mother Lode proved small and of relatively low grade. The two shoots mentioned by Browne (1868, p. 35) on the Peñon Blanco claim were 2 and 4 feet thick and averaged $10-12 per ton near the surface. Inasmuch as these were considerably enriched through removal of worthless material during alteration in the oxidized zone, it is probable that the grade of ore lessened with depth.

In 1868, workings consisted of a 175-foot crosscut adit driven from the west or footwall side, a 285-foot crosscut adit driven from the east or hanging wall side and two shallow shafts 2000 feet apart (Browne, 1868, p. 35). All of these apparently were on the Peñon Blanco claim. By 1896, there were 2 adits 25 and 100 feet long, respectively, and several open cuts on the Old Judge claim; a 200-foot adit on the North Peñon Blanco claim; and more than 1000 feet of tunnels, drifts and shafts on the Peñon Blanco claim (Storms, 1896, p. 221). According to Logan (1935, p. 186), the Oro Rico Mines Company drove a 600-foot crosscut which reached the vein at a depth of 320 feet and more than 1000 feet of drifts were run from this adit. From the floor of the northwest drift a winze was sunk to a depth of 450 feet and 4 levels of unknown length were driven. In August 1955, five workings were still recognizable on the Peñon Blanco claim, two adits and a shaft toward the south end of the claim on the east side of the ridge and one adit and shaft toward the north end on the west side of the ridge. None of these workings would be accessible without some cleaning out and none were entered.

Ortega Mine. Location: Sec. 19, T. 5 S., R. 17 E., sec. 24, T. 5 S., R. 18 E., M.D., on Highway 140 midway between Nigger Hill and Guadeloupe Mountain. Adjoins the Sorrel (Sarle) mine on the north. Ownership: Frank A. Cassaccia, Mariposa, California owns a tract of about 125 acres which includes the Ortega mine. Formerly part of Las Mariposas Grant.

Gold was discovered at the Ortega mine in the early 1850s by a Spanish Californian named Ortega. He worked the vein extensively until Fremont gained title to Las Mariposas Grant in 1859. Ten or more shafts were sunk on the vein over a distance of 1485 feet (Julihn and Horton, 1940, p. 131), all but two of these being north of Highway 140. The deepest of the shafts, cleaned out and reconditioned in 1936-37 was found to be 167 feet deep measured along the incline. Milling was done mainly in arrastras but some ore was milled in a 2-stamp mill by a millman named Turner. After Fremont dispossessed Ortega's group in 1859, no further work was done until 1900 when some ore found lying on the dumps was milled at the Princeton mill and yielded between $14 and $27 per ton (Julihn and Horton, 1940, p. 131). In 1934, a partnership of Price, Willmer, Givens and Givens leased the mine from the Mariposa Commercial and Mining Company. This group cleaned out the No. 3 shaft to a depth of 180 feet and ran a drift 125 feet south. Good ore was found below the old Mexican workings 10 tons of which yielded $91.60 per ton. However, the quantity of ore developed proved small and the partnership was forced to withdraw because of insufficient funds to properly develop the mine. In 1936 John Q. Finfrock leased the property and operated it until 1940. He cleaned out and rehabilitated the No. 4 shaft, mined considerable new ore and processed some old broken ore found on the property. In 1940 the property was again taken over by Mariposa Commercial and Mining Company and put in charge of D. Mullins. In 1941 the Ortega mine was one of a group optioned to J. K. Wadley of Texarkana, Arkansas and placed under the management of Charles Greenameyer. World War II prevented continuation of this enterprise and no further work had been done at the Ortega mine up to September 1955.

Two veins have been found on the Ortega property. The main vein averages about 3 feet wide, strikes about N. 20° W. and dips 50-60° W. It is a continuation of the vein which crosses the Sorrel mine south of Highway 140. Vein matter is coarse milky quartz containing sphalerite, pyrite, chalcopyrite, galena and arsenopyrite as well as native gold. At various places along its length the vein fissure has been intruded by pegmatite, aplite and dark granitic dikes. The enclosing rock is coarse-grained biotite granodiorite. A second vein was discovered in the late 1930s about 500 feet east of the No. 4 shaft which strikes N. 30° W. (Julihn and Horton, 1940, p. 132). This vein has not been well explored nor has the possible point of junction of the 2 veins been discovered.

A line of caved shafts and stopes extending northwest from Highway 140 marks the position of the old workings. None of these were accessible in July 1954 and the various shafts could not be identified. The shafts were evidently numbered from north to south, no. 2 and no. 3 shafts lying 170 feet apart. The No. 4 shaft, worked by Finfrock in the late 1930s, was 167 feet deep and had 3 levels at 100, 147 and 167 feet, respectively. According to Julihn and Horton all of the ore above the 100-level south of the shaft has been stoped. Ore was found in place on the 147-level from within 60 feet of the shaft to 347 feet south of the shaft and ore has been found continuously from 30 feet north of the No. 3 shaft to the No. 4 shaft. The length of one ore shoot must be at least 527 feet with a width varying from 2½ to 4 feet. Disposition of other workings indicates that the vein must have been almost continuously mineralized for over 1000 feet. The workings in the vicinity of the No. 4 shaft draw 24,000 gallons of water a day (Julihn and Horton, p. 132, 1940).

The early production of the Ortega mine was not recorded. Julihn and Horton state that "a total of $19,796 was recovered by Finfrock from ore taken from the levels once operated by Ortega and from remains of their surface dumps. Of this total, $10,154 was derived from 691 tons of newly mined ore, an average recovery of $14.69 per ton, and 346 tons of old gob yielded an estimated $5 per ton. In milling, 9700 pounds of concentrates were recovered which assayed $171.54 per ton."

Our Chance (Clark Mines, Albert Austin group) Mine. Location: Sec. 29, T. 4 S., R. 18 E., on the Sherlock Creek road, 4 airline miles northeast of Mt. Bullion. Adjoins the Diltz mine on the west. Ownership: Not determined.

The following discussion is drawn chiefly from Julihn and Horton (1940, pp. 147-148), the last authors to visit the mine while it was operating. The Our Chance mine apparently was first worked by Albert Austin who is supposed to have recovered more than 2000 oz. of gold from pockets near the exposed surface of the vein. Austin used a hand mortar and an arrastra. A pocket taken out by Arthur Clark, the last operator, yielded about $17,000. Clark operated the mine from 1932 to about 1946, mining and milling a total of 2563 tons of ore yielding 1357.77 oz. of gold and 223 oz. of silver (U. S. Bureau of Mines records) or an average of about $18.60 at current metal prices. The mine is noted for its specimens of crystallized and arborescent gold.

The Our Chance vein strikes northwest and dips about 27° northeast, the width averaging 14 inches but varying between 4 inches and 4 feet. Above the vein is a dike of dark granitic rock 4 to 6 feet thick. Wall rocks enclosing the vein and dike are pyroxene andesite greenstones of unknown age. Vein matter is banded quartz with pyrite, chalcopyrite, arsenopyrite, galena and native gold, in places associated with calcite and manganese oxides.

The principal working in 1938 was an 800-foot adit driven northeast to the vein with 2500 feet of connecting drifts, winzes, etc. At the end of the adit is a 500-foot southeast drift which has a 200-foot winze sunk 200 feet from the end of the adit. At a depth of 100 feet a level has been run from the winze 100 feet to the southeast and 70 feet to the northwest. Above the drift from the main adit ore has been stoped to a height of 50 or 60 feet between the adit and winze for a length of 175 feet. Between the winze and the end of the drift there is a 300-foot stope about 100 feet high. Very little timbering is required. The mine was idle in October 1955 and there was no equipment on the property.

Permit (Boulder, Kockel, Bulldog, Bullpup) Mine. Location: Sec. 23, 31, T. 4 S., R. 18 E., M.D., on Whitlock Creek 3 airline miles northeast of Mt. Bullion. Accessible via the Whitlock-Sherlock Creek graded dirt road. Six miles north of Mariposa. Ownership: Permit Mining Company, c/o H. H. Odgers, Midpines, California, owns 5 unpatented claims, the Aladdin, Aladdin No. 1, Aladdin No. 2, Permit and Permit Extension.

According to Castello (1921, p. 109) the old Bulldog and Bullpup claims were located in 1894 but an entry in the Mining and Scientific Press (vol. 60, no. 14, p. 232, 1890) indicates that the Bulldog mine operated that year under N. J. Farrens, producing a few tons of low grade ore. In 1904 (Wilkinson, 1904, p. 10) the owner of the Bulldog was listed as Czerney and Company of Merced. In 1916 the Bulldog claim was operated by Theodore E. Kockel of Lyons Gulch and the Bullpup by Jack Czerney of Merced. At that time there was a shallow shaft on the Bulldog claim and an inclined shaft 165 feet deep with 100 feet of drifts on the Bullpup claim. By 1928 the mine had been renamed the Permit and consisted of 2 claims, the Boulder and Permit, owned by Theodore Kockel of Mariposa (Laizure, 1928, p. 110). In 1932 the mine was acquired by the Permit Mines, Inc. of Mariposa. At that time the directors of the company were A. J. Walters, J. J. Fahnlender, Mabel R. Brocke and Theresa J. Thompson. More recently the Permit Mining Company has been operated by E. B. Cook of San Francisco and H. H. Odgers of Midpines. A small production was recorded in the 1930s and again in the late 1940s. From 1898-1900, a total of 241.87 oz. of gold was produced from the Bulldog and Bullpup claims. In 1912 the Kockel mine (Bulldog) produced 6.87 oz. of gold from 28 tons of ore (U. S. Bureau of Mines records). The mill is fully equipped and the mine is operated intermittently.

The main vein on the Permit property is on the same system that extends from the Milburn mine north to the Nutmeg mine. At the Permit mine it strikes N. 10-20° W., is nearly vertical and is 2-4 feet wide. According to Laizure (1935, p. 40) there are two other more or

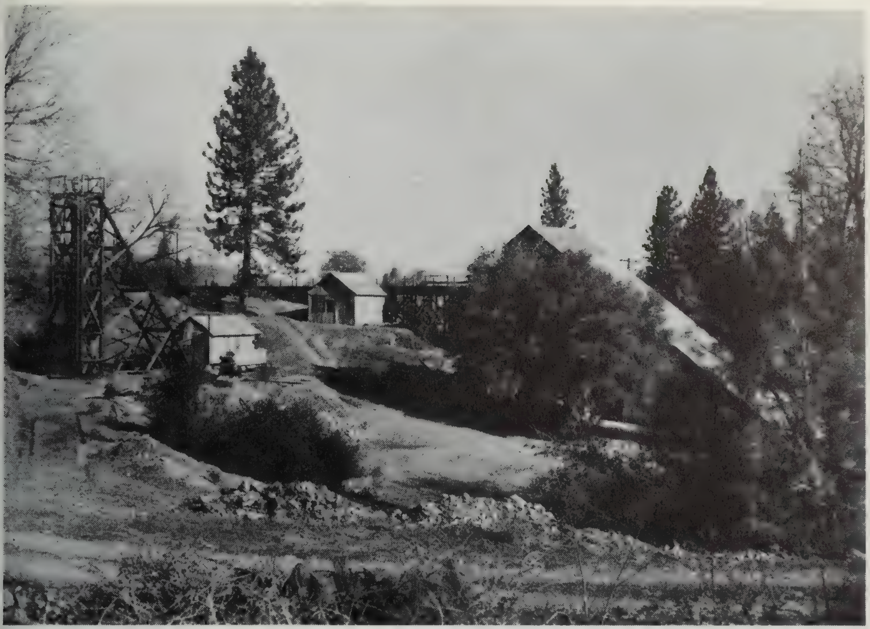

Figure 34. Installations of the Permit mine, Sherlock Creek district. *Photo by Mary H. Rice.*

less parallel veins. He describes a west vein 3-4 feet wide, a center vein 2 feet wide and an east vein 2 feet wide. In 1935 there was a 70-foot shaft on the west vein, a 70-foot shaft with a 500-foot drift on the center vein and a 74-foot shaft on the east vein. At that time ore averaged $15 to $20 a ton. The main vein observed by the authors apparently is the center vein mentioned by Laizure. Wall rocks are pyroxene andesite greenstones of unknown age. In 1954 the mine was fully equipped with hoist house, compressor house and mill but there was no one on the property and the equipment was not accessible.

Pine Tree and Josephine Mine. Location: Secs. 8, 9, 16, 17, T. 4 S., R. 17 E., M.D., on Highway 49, 2 miles north of Bear Valley. Ownership: Pacific Mining Company, Crocker Building, San Francisco, California, owns about 5⅓ square miles of the northern end of the former Las Mariposas Grant which includes the Pine Tree and Josephine, French, Evans and Queen Specimen mines.

History: Along with the Princeton and Mariposa mines the Pine Tree and Josephine mine is among the best known and most chronicled in the southern part of the Sierran gold belt. Conspicuously located astride Highway 49 overlooking the Merced River it has a prominence and background of historical romance equalled by few other gold mines. The Pine Tree and Josephine vein system was discovered in 1849, probably soon after discovery of lode-gold at the Mariposa mine. Originally separate mines, the Pine Tree and Josephine have been worked jointly for so long that they have emerged as a single property.

The original locators and operators of the mine, whose names have been forgotten, lost their rights and title to the Pine Tree and Jose-

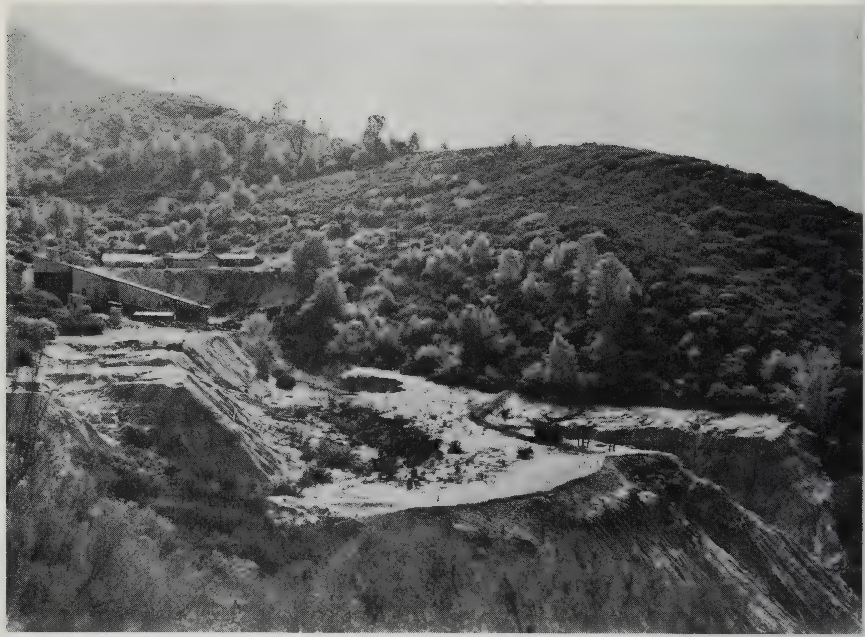

FIGURE 35. Tailings dump and mine buildings at the Pine Tree and Josephine gold mine on Highway 49 between Bear Valley and Bagby. The principal mine opening is a long adit driven away from the observer from a point behind the shop buildings. The mine has a production of about $4,000,000. *Photo by Mary H. Rice.*

phine mines through a court decision in 1859 giving John C. Fremont control of the vast Las Mariposas Grant of 44,387 acres. In spite of the court decision an armed struggle for possession of the mines took place in 1859 and Fremont's followers were actually besieged on the fortified Pine Tree property by miners then in possession of the Josephine mine. Fremont ultimately gained undisputed possession of all the grant mines, but his management was never very successful. Logan states: "the grant properties became subject to one promotion scheme after another and comparatively little gold was produced (considering the possibilities) until 1900. . . ." In 1862 a disastrous flood damaged many of the grant mines. In 1863 a group of Fremont's creditors in New York formed a stock company capitalized for $10,000,000 but this company went into receivership in 1864. In spite of the financial vicissitudes of Las Mariposas Grant at large, the Pine Tree and Josephine mines operated almost continuously through the 1860s to about 1875. The elaborate Benton mill with its much publicized Ryerson process of dry-milling and steam-activated amalgamation, was built about 1865 just south of the present town of Bagby on the Merced River. This was ultimately enlarged to 80 stamps (Raymond, 1871, p. 28). In 1873 the Mariposa Land and Mining Company succeeded the former Mariposa Company. Under this management a long tunnel was driven south on the vein which ultimately reached a length of 3300 feet and extended under the Queen Specimen mine workings to a depth of 1200 feet. It was the intention of the company to extend this tunnel clear to Mariposa, a distance of 12 miles, but the ore shoots

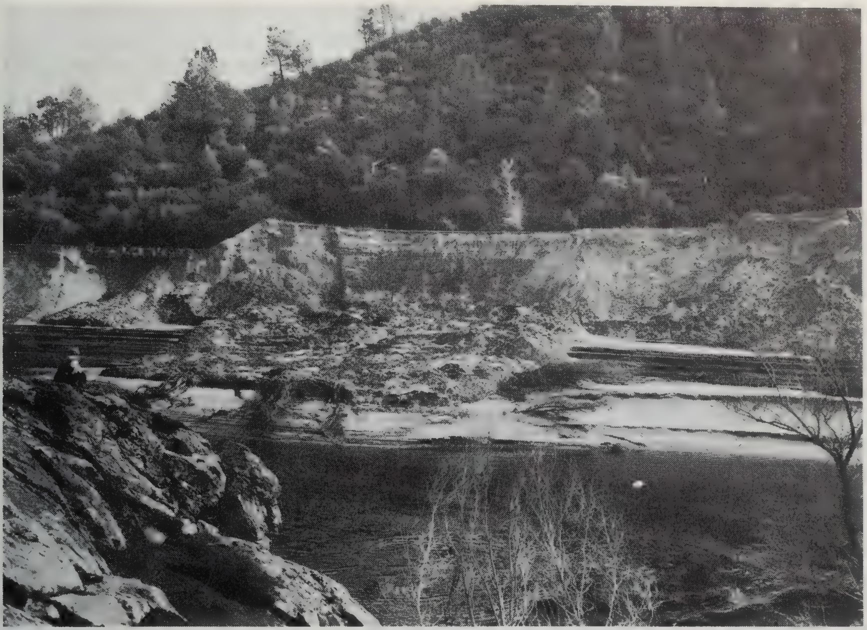

FIGURE 36. Large tailings dump consisting of vein matter that has been crushed during recovery of the precious metals. Tailings were piped down from the Pine Tree and Josephine mill shown in figure 30. The dump is on the Merced River east of Bagby. *Photo by Mary H. Rice.*

encountered proved disappointing and the strength of the company was gradually dissipated in litigation and internal disputes. The grant was finally purchased at sheriff's sale by a man named Donahue. In July 1887, the present Mariposa Commercial and Mining Company was organized by San Francisco financiers headed by Hayward, Flood, Hobart, Jones and Mackey, who bought the grant from Donahue. This group engaged in little or no mining and little was done at the Pine Tree and Josephine mine until after 1898 when the company was reorganized with Fred Bradley as president. Sustained mining began about 1900 and was successfully continued until about 1915, about a third of a million dollars being produced from the Pine Tree and Josephine property. Another period of inactivity ended in 1933 with acquisition of the northern end of the grant by Pacific Mining Company. Between 1933 and 1944 this company operated continuously and achieved by far the greatest production ever realized by the mine. Operations ceased because of wartime conditions and the mine has never resumed production because of high operating costs. The property is by no means exhausted of ore and simply awaits more favorable economic conditions.

Geology: The Pine Tree and Josephine mine workings follow ore shoots in various parts of a single, immense, multiple-vein system, the Mother Lode here averaging at least 125 feet wide. It strikes N. 30-35° W. and dips 55-60° northeast. In general the vein system occupies a thrust fault of large displacement bordered on the east by serpentine and on the west by the Mariposa slate. Both of these rock units are believed to be of Upper Jurassic age. A typical cross section of the

Mother Lode in the Pine Tree workings is in the vicinity of the No. 2 East and No. 3 West crosscuts on the level of the New Pine Tree Tunnel (see Logan, 1935, p. 188). Southwest to northeast across this section the character of the vein is as follows:

Footwall side—black Mariposa slate	thickness unknown
Josephine "vein"—quartz lenses and stringers in brecciated slate with ore shoots	18 feet
Massive carbonate rock—ankerite—mariposite-quartz rock probably derived by replacement of serpentine	60 “
Old Pine Tree "vein"—ribbon quartz with ore shoots (largely stoped)	10 “
Milky (bull) quartz—massive, barren of ore or low-grade	12 “
Hanging Wall Pine Tree vein—ribbon quartz with ore shoots	8–14 “
Serpentine and talc schist	10 “
Greenstone or metadiorite	25 “
Hanging wall side—serpentine	thickness unknown

One version of the structure of the Mother Lode at the Pine Tree and Josephine mine to a depth of about 1200 feet is shown facing page 108 of Julihn and Horton (1940). In the ore shoots ore minerals are chiefly pyrite, arsenopyrite, and native gold with minor chalcopyrite, sphalerite, galena, niccolite and millerite. Copper has been the only metal recovered other than gold or silver. The nickel content of the concentrates ranges from 0.35 to 1.35 percent and during 1936 averaged 0.77 percent (Julihn and Horton, 1940, p. 110). Erythrite and danaite, both containing cobalt, have been found in the mine but presumably are rare and well disseminated. Thus far there has been no attempt to recover the nickel or cobalt.

According to Storms (1900, p. 144), the Old Pine Tree and Josephine veins in the southern parts of the Josephine mine are very close together—in places less than an inch apart, whereas they diverge to the north and are 60 feet or more apart. The Mother Lode pinches materially between the Pine Tree mine and Bagby as well as to the south toward Bear Valley. Between Bear Valley and Mt. Bullion the Mother Lode is represented by several en echelon veins rather than by a single wide multiple vein. The northeast-trending veins represented by the French and Lucky Boy veins do not intersect the Mother Lode in the vicinity of the Pine Tree and Josephine mine.

Workings: The workings of the Pine Tree and Josephine mine are connected by a single raise driven, during the last stages of operation, from the Pine Tree Tunnel level to the English Trail Tunnel level of the Josephine mine. The April adit in the Pine Tree mine and the September adit in the Josephine mine are only about 200 feet apart and at approximately the same elevation. The River Tunnel extends under the Queen Specimen mine and if extended would connect with main (MacKenzie) underground shaft in the Pine Tree workings theoretically at the 1150-level. The accompanying diagram shows the disposition of the workings.

The most southerly working is the McMurray shaft, about 60 feet deep which has no lateral workings of note. The Josephine workings begin with the Josephine and the Hunt and Oyler adits about 550 feet north of the McMurray Shaft, the last about 275 feet above the Josephine adit. Connecting with the Josephine adit is the September adit, nearly 1200 feet farther north, and there are three others, the No. 1, No. 2 and English Trail in between. A winze from the Josephine adit has 3 levels, the 100, 300 and 500 and there is one drift level (the Black drift) between the Josephine and Hunt and Oyler adits connected by winzes. The total depth developed on the vein in the Josephine workings is 820 feet and the total length of workings is about 7700 feet. The principal ore shoot is developed for at least 600 feet.

The Pine Tree workings consist of 7 adits spread over a distance of about 1500 feet. The principal working is the New Pine Tree adit about 1200 feet long and the inclined MacKenzie shaft sunk from the New Pine Tree adit approximately 600 feet from the portal. The MacKenzie shaft serves levels at 150, 270, 430, 550, 700 and 850 feet and there are 3 levels above the New Pine tree adit at depths of about 150, 200 and 250 from the surface. The workings aggregate over 8 miles.

Summary of Production: The estimated production of the Pine Tree and Josephine mine is over $4,000,000 (Bradley, 1954, p. 32) and the recorded production is about $3,386,000. Prior to acquisition by Fremont no production records are available, due chiefly to secrecy connected with disputes and the final litigation. Between 1860 and 1863 forty-five thousand tons of ore was mined which yielded $350,000, an average of $7.77 per ton (Logan, 1935, p. 187, quoting Browne). In 1864 production was $67,940. For the fiscal year ending in July 1870 the Mariposa and Pine Tree and Josephine mines yielded $170,000 of which nearly $100,000 (Browne, 1868, p. 30) must have come from the Pine Tree and Josephine. No records are available for the period 1865 to 1875 but the yield must have been substantial. Little or no mining was done between 1875 and 1900. From 1900 to 1915 the production was $371,748 from 20,968 tons of ore for an average of $12.40 per ton. Between 1933 and 1937 production was $989,174 from 170,943 tons of ore or an average of $5.78 per ton, and $271,392 was produced from 55,021 tons of ore in 1938 (Pacific Mining Co. records). From 1939 to 1944 a total of 248,481 tons of ore yielded 35,215 oz. of gold, and 8219 oz. of silver for a gross of about $1,242,000, an average of $5.00 per ton.

Princeton, New Princeton and Princeton Extension. Location: Secs. 13, 18, T. 5 S., R. 18 E., M.D., at the southern outskirts of Mt. Bullion on the paved Mt. Bullion-Cathay road. Ownership: Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa, California owns a tract of land containing several hundred acres that includes the Princeton and several adjoining mines. Formerly part of Las Mariposas Grant.

The Princeton mine was discovered in 1852 (Browne, 1867, p. 29) and has had a history similar to other large mines of Las Mariposas Grant (see Mariposa and Pine Tree and Josephine). It has the greatest recorded production of any mine in Mariposa County and the size of the workings is exceeded only by the Pine Tree and Josephine mine. At various times it has been the largest producer in the state. During the early years of its history the ore yielded about $70 per ton, to a depth of about 100 feet, but the bulk of the ore mined ran between $4 and $7 per ton at the old price of gold. By 1867 it had reached a depth of 560 feet as measured on the incline, and had been explored along the strike for 1200 feet (Browne, 1867, p. 41-42; 1868, p. 30).

The New Princeton mine, adjacent to the Princeton to the southeast was discovered and developed between 1871 and 1875 (Raymond, 1871, p. 30). Two inclined shafts were sunk on this location 200 feet apart.

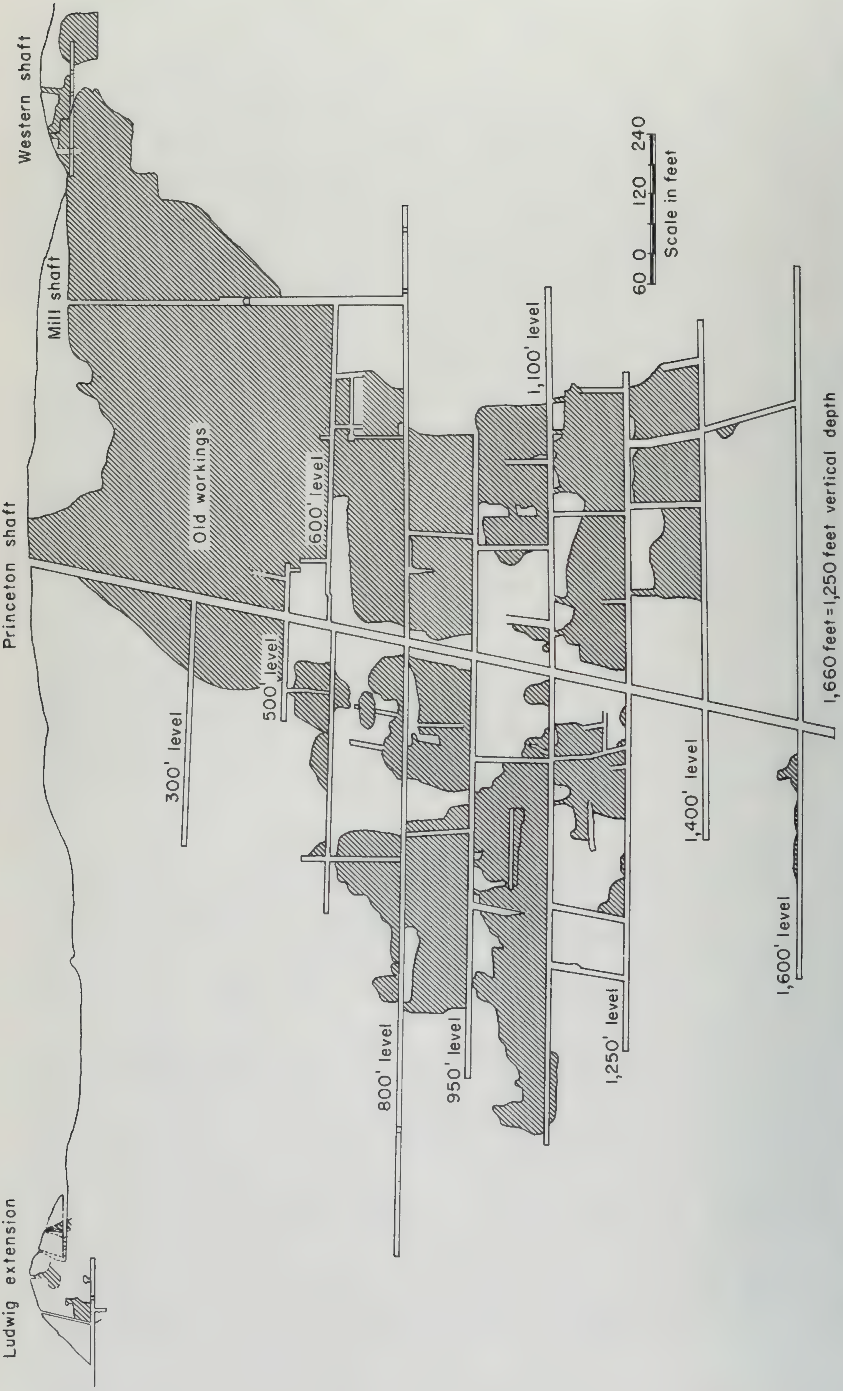
Ludwig extension
Princeton shaft
Mill shaft
Western shaft
Old workings
300' level
500' level
600' level
800' level
950' level
1,100' level
1,250' level
1,400' level
1,600' level
1,660 feet=1,250 feet vertical depth
60 0 120 240
Scale in feet

FIGURE 37. Longitudinal section in the plane of the vein of the Princeton gold mine showing stoped areas. *Reproduced from figure 46 of U. S. Bureau of Mines Bulletin 424 (Julihn and Horton, 1940).*

According to Knopf (1929, p. 84) a shaft 300 feet deep was sunk at the New Princeton between 1921 and 1924. It had levels at 150 and 300 feet.

Between 1875 and 1900 the mine lay idle but mining was resumed and vigorously pursued between 1900 and 1911 under the direction of John H. MacKenzie. The shaft was deepened to 1600 feet (inclined) and lateral workings greatly expanded. During this period most of the ore in the main shoot was stoped to a depth of 1200 feet (Lowell, 1916, p. 595). A small tonnage of ore was mined in 1915 after which the mine again lay idle until 1921. That year T. E. Kelso and W. H. Holmes contracted to purchase the Princeton mine and held the property until 1927 when a forest fire destroyed the surface buildings (Laizure, 1928, p. 111). Soon after this the property reverted to the Mariposa Commercial and Mining Company. Under Kelso and Holmes 3944 tons of ore was mined which averaged about $3.16 per ton at the old price of gold. W. J. Loring was their superintendent in 1924.

Lessees produced a small tonnage of high-grade ore in 1930-31 and 3828 tons of ore and tailings were milled between 1935 and 1941, but no sustained mining has been carried on at the Princeton mine since 1927.

The Princeton vein, believed to be part of the Mother Lode system, occupies a thrust-fault fissure cutting slate of the Upper Jurassic Mariposa formation. The slate contains thin beds of dark-colored graywacke and is cut by dikes of sheared, fine-grained granitic porphyry. Some of these interesect the vein. The trace of the vein is not well defined at the surface and lacks the massive, multiple characteristics of the Mother Lode at the Pine Tree and Josephine and Mount Ophir mines. The vein is en echelon to the vein passing through the Mount Ophir but is more or less in line with the veins passing through the Greens Gulch, Louis and Mountain View mines. It is probable that the Mother Lode in this vicinity consists of several separated veins rather than one or two major persistent features. The Princeton vein system strikes N. 54-57° W. and dips 45 to 60° northeast, averaging perhaps 50°. Vein matter, which is ribboned, milky quartz carrying numerous parallel sheets of included wall-rock, varies from 4 to 8 feet wide. Parts of the vein which constitute ore carry a considerable amount of pyrite. Native gold is seldom visible but minor amounts of galena, sphalerite and tetrahedrite are commonly seen (Knopf, 1909, p. 85). At the New Princeton workings the slate is severely bleached and hydrothermally altered near the vein.

The main shaft of the Princeton mine, now caved and inaccessible, is 1600 feet deep, measured on the incline, and reaches a vertical depth of about 1250 feet. It has 9 levels at 300, 500, 600, 800, 950, 1100, 1250, 1400 and 1600 feet. The longest level is the 800, approximating 2100 feet. There is a total footage of drifts approximating 11,500 feet together with over 3000 feet of crosscuts and raises. The old Phillips shaft, about 350 feet southeast of the main shaft was approximately 600 feet deep. On the New Princeton part of the property the 6 x 10 ft. main shaft (east shaft) is 300 feet deep and has levels at 100 and 300 feet. The west shaft is 60 feet deep. The New Princeton shaft was open to a depth of about 75 feet in August 1955.

There are various estimates as to the total production of the Princeton mine. A total of $4,397,743 is well authenticated. Storms (1900, p.

143) conservatively estimated the production to 1900 at $3,000,000 and production since that time has been $1,397,743, calculated from records of the Mariposa Commercial Mining Company and U. S. Bureau of Mines. Raymond (1871, pp. 30-31) places the early production at $4,000,000 to $5,000,000 and Knopf (1929, p. 84) places the total production to 1929 at $5,000,000. The mine has been characteristically one of large ore bodies of relatively low grade, although the characteristic ore mined prior to 1915 would yield $10.50 per ton at the present price of gold.

Pyramid (Castagnetto I) Mine. Location: Secs. 14, 15, 23, T. 4 S., R. 16 E., M.D., on the west bank of Cotton Creek half a mile from the paved Hunter Valley road or about 9½ miles from Hornitos. Ownership: Lloyd A. Mason, Hornitos, California owns about 200 acres of patented agricultural land which includes the Pyramid mine.

The Pyramid mine was discovered prior to 1900, probably by Daniel Castagnetto. It was operated for a time in 1915-16 by C. H. Burt and Dodge of Bear Valley (Castello, 1921, p. 110). In 1925 the mine was purchased from the Castagnetto estate by George K. Allen of Piedmont (Laizure, 1928, p. 83). A mill was installed and some development work was done but there was no sustained production. In the middle 1930s it was operated by the Pyramid Gold Mining Company in which Eugene B. Gratton of San Jose and Lloyd Mason of Hornitos were the principal officers (Julihn and Horton, 1940, p. 121). From 1933 to 1942 a total of 5117 tons of ore was mined from which 4062.33 oz. of gold and 544 oz. of silver were taken for an average value of $27.86 per ton. The total production of the mine must be at least $200,000.

At the surface the main vein at the Pyramid mine strikes N. 60-65° W. and dips 45-71° southwest. According to Julihn and Horton (1940, p. 121) the vein steepens to 80° within 190 feet of the surface. Vein matter is mainly milky quartz with a little white calcite and includes leaves and fragments of wall rock. Ore minerals are native gold, pyrite, galena and sphalerite. About 95 percent of the gold is free-milling. Sulfide concentrates amount to only ½ percent of the ore (Julihn and Horton, 1940, p. 121) but contain 5 to 6 oz. of gold per ton. Wall rocks are chiefly pyroxene andesite greenstones belonging to the Upper Jurassic Amador group with thin strata of tuffaceous slate. Julihn and Horton (1940, p. 121) state that diorite forms the hanging wall of the mine, but no diorite was seen by the authors at the surface and none was on the dumps. A narrower parallel vein has been worked to some extent about 600 feet south of the main shaft.

Workings consist of four shafts two of which apparently have not been used since early days. The main working in the 1930s was a 6 x 10 foot shaft 190 feet deep with three levels at 65, 105 and 175 feet. From this shaft there is a 90-foot north drift and a 240-foot south drift; 238 feet of drift north and 85 feet south on the 105-foot level and 215 feet of north drift on the 176-foot level (Julihn and Horton, 1940, p. 121). A second shaft is 165 feet deep, but the depths of the others are not known. None were accessible to the authors in August 1954. The compressor hoist and hoist had been damaged because of sliding ground. The 5-stamp mill appeared to be in fair condition. No recent work has been done at the property.

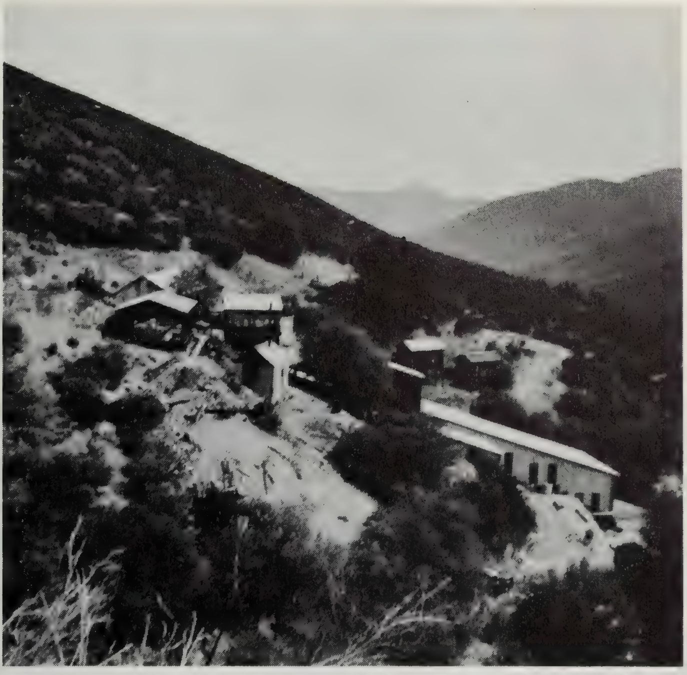

FIGURE 38. Mine installations at the Quail gold mine on the north side of Indian Creek Canyon 5 miles southeast of Greeley Hill. The mine is entered by several adits, openings of which are not shown in the photo. Mine workings were being put into condition for operation during 1955. The Quail mine has a long record of productivity extending back prior to 1873 and totaling over $400,000.

Quail (Alvina, Hartford) Mine. Location: Secs. 15, 16, T. 3 S., R. 17 E., M. D., on the north side of Indian Gulch about 7 miles by fair dirt road southeast of Greeley Hill. Accessible via McDiermid guard station and Date Flat. Ownership: H. E. Moerlien, San Martin, California owns four patented lode claims, the Juniper, Sunset, Bonanza and Mammoth, 7 unpatented claims, the Violet, Starlight, Morn Sight, Fairview, and West Lode 1, 2 and 3, plus several mill sites aggregating over 380 acres.

The Quail mine was discovered prior to 1873 and has a total production estimated at slightly more than $400,000 (Julihn and Horton, 1940, p. 140). The first owners of record were Hanbidge and Gonigall who made a strike of good ore in 1873 (Min. and Sci. Press, vol. 26, No. 10, p. 149, 1873). These operators had driven at least one tunnel by 1873 and were in process of driving a raise for ventilation. By 1891 ownership had passed to Francisco Bruschi and considerable production was maintained. Ore was said to average $15 per ton in native gold and sulfide concentrates ran $800-$900 per ton (Min. and Sci. Press, vol. 62, no. 12, p. 180; vol. 62, no. 18, p. 276). Various members of the Bruschi family operated the property intermittently through the 1890s. In 1899 the property was bonded for a short time to Kendall Brothers and Whitney at which time the working tunnel was 700 feet long and an 18-inch wide shoot of ore was being mined. Later in 1899 the mine was sold by D. Bruschi to the Quail Mining and Milling Company, a group made up of Sonora, California, businessmen (Min. and Sci. Press, vol. 78, no. 18, p. 488; vol. 78, no. 21, p. 565). A 4-stamp mill was moved onto the property from the Louisiana mine and it was renamed the Hartford mine in 1900. The *Engineering and Mining Journal,* vol. 68, no. 12, p. 293, 1899, states that the mine included 3 tunnels, one 800 feet long, one 1300 feet long, and the third of unstated length, and that an ore shoot 2½ feet wide was yielding ore running $20 per ton. Between 1899 and 1901 a small production of gold was recorded that year. Operations were carried on through 2 working tunnels and 4 raises. The vein varied between 18 and 60 inches wide and ore averaged $7.50 per ton at the old price of gold (Eng. and Min. Jour., vol. 71, no. 9, p. 283, 1901). There is no record of activity at the mine between 1901 to 1915. Various lessees worked the property under agreement with the Bruschi Brothers between 1915 and 1920. Some ore was milled which ran between $9 and $12 per ton at the prevailing price of gold (Castello, 1921, p. 134). A 10-stamp mill was destroyed by fire in 1917. Castello states that the workings, in 1920, consisted of a tunnel about 1000 feet long, two shafts 150 feet and 55 feet deep, respectively, and several stopes and raises. In 1915 one of these stopes was reported to be 200 feet long and 70 feet high (Lowell, 1916, p. 595). Between 1920 and 1935 the mine lay idle until reactivated late in 1935 by J. E. King and associates of Sonora. About 1937 the property was purchased from J. Bruschi by Quail Gold Mines, Inc., Jerome L. Drumheller of Spokane, Washington, in charge and Otto D. Rohlfs of Coulterville, general manager. Between 1937 and 1942 a total of 7161 tons of ore was milled which yielded 444 oz. of gold and 394 oz. of silver or an average of approximately $2.22 per ton. Again idle through the war years, the Quail mine was leased in 1949 from Jerome Drumheller by the Golden State Mining Company, a partnership of George Marshall, Clarence and Stanley Silvia and H. E. Moerlien. More recently ownership has passed to H. E. Moerlien of San Martin, California, who has been retimbering two adits and preparing to reopen the mine. A fully equipped 60-ton per-day capacity mill is on the property which includes jaw crushers, ball mill, shaking tables, flotation cells, etc.

The principal vein at the Quail mine strikes N. 20-25° W. and dips 30-35° NE as it passes through the Juniper, Mammoth and Bonanza claims, but swings to a north strike as it crosses the Sunset claim. The width varies between 18 inches and 5 feet. According to Julihn and Horton (1940, p. 140) the vein fissure has been intruded over much of its length by and aplite dike about 2 feet wide which at some places follows the footwall side of the vein and at others the hanging wall. Vein matter consists of milky quartz with pyrite, galena, sphalerite, tetrahedrite and native gold. Wall rocks consist of mottled slate, sandy slate and associated schistose metasediments belonging to the Paleozoic Calaveras group. The slate cleavage in the upper adit strikes N. 40° W. and dips 75-80° NE.

The principal operating workings are two adits, one 90 feet vertically above the other. The lower adit is 700 feet long and the upper one 550 feet. These probably have not been reopened the full length of former workings. The upper tunnel is connected with the surface by a 135-foot raise 200 feet from the portal of the adit and the lower adit is connected to the surface by a 328-foot raise 300 feet from the adit portal.

These raises were in need of cleaning out in August. 1954. The adits had been newly re-timbered and were in good condition.

Queen Specimen Mine. Location: Sec. 8, T. 4 S., R. 17 E., M. D., on Highway 49 a quarter of a mile north of the Pine Tree mine buildings, 3 miles north of Bear Valley and 1 mile south of Bagby on the Merced River. Ownership: Pacific Mining Company, 1022 Crocker Building, San Francisco, California, owns a large acreage of the former Las Mariposas Grant, which includes the Queen Specimen, Pine Tree and Josephine, French and Evans mines.

The Queen Specimen mine has a history more or less parallel to the Pine Tree and Josephine mine which it adjoins on the northwest (see Pine Tree and Josephine mine). It was discovered in the 1850s and worked in a small way prior to acquisition of Las Mariposas Grant in 1859 by Fremont. It was worked by the Mariposa Mining and Commercial Company in 1908 and in 1915, producing a total of 657.5 tons of ore yielding $6029.22 or a total of $9.16 per ton at the old price of gold (Logan, 1935, chart facing p. 188). During the period 1922-1924 the mine was operated under lease from the Mariposa Commercial and Mining Company. In this period 3000 tons of ore was milled which yielded $4 per ton and an undisclosed quantity of tailings which carried $2.50 per ton (Knopf, 1929, p. 84). Little has been done at the property since 1924 and the workings are caved and inaccessible.

The multiple vein on the Queen Specimen property is the northwestern extension of the Mother Lode as seen at the Pine Tree and Josephine mine. It has a general strike of N. 35° W., and dips 60-70° northeast and has an aggregate thickness of about 105 feet. Ore occurs almost entirely on the footwall side, varying between a few feet and 12 feet thick and yielding $4 to $12 per ton (Knopf, 1929, p. 84). Knopf describes the cross section along the main adit SW to NE as follows:

1. serpentine—130 feet
2. black slate—370 feet
3. quartz—3-12 feet
4. ankerite-quartz-mariposite rock netting with quartz veinlets—15 feet
5. talc schist (derived from serpentine)—30 feet
6. greenstone (locally called diorite, hydrothermally altered, pyritized and sheared—48 feet
7. black slate—extent not measured

The ore shoot was 1-1½ feet thick on the footwall side of the quartz member of the vein system. Primary minerals in the ore shoots are native gold, pyrite, tetrahedrite and chalcopyrite, probably with minor amounts of additional minerals similar to those at the Pine Tree and Josephine mine. Joints in the quartz member of the vein system were described by Knopf as being stained by azurite in some places.

Mine workings in 1924 consisted of: (1) A main 500-foot crosscut adit, driven northeast approximately perpendicular to the strike of the vein system, a connecting main drift 400 feet long and a raise with levels at 100 and 125 feet above the adit level. (2) An upper adit driven 200 feet (vertically) above the main adit connected with a 250-foot drift. (3) A lower crosscut adit, about 500 feet north of the upper adit, with minor drifts. (4) A 150-foot drift adit and stope about 400 feet northwest of the lower crosscut adit. None of these workings were accessible in September 1955.

Red Bank (Stevenson group) Mine. Location: Sec. 36, T. 3 S., R. 16 E., M.D., on the northeast bank of the Merced River 1½ miles northwest of Bagby. Accessible via half a mile of unimproved dirt road from Highway 49, the turnoff being 1½ miles from Bagby. Ownership: Percy L. Pettigrew, Box 639, Palo Alto, California, and Horace Meyer, Cathay, California, own the Daisy, Jubilee and Syndicate lode claims and three placer claims totaling about 165 acres. Most of this holding is patented.

The Red Bank mine was probably discovered in the late 1860s. Most of the early work done consisted of placering and ground sluicing. In 1881 hydraulic mining was started under Colonel Swadley (Min. and Sci. Press, vol. 43, no. 26, p. 429, 1881) but from the looks of the property no great yardage of material was handled in this way. The first extensive underground mining was done between 1894 and 1897 by the Redbanks Mining Company under Isaac Solhinger (Min. and Sci. Press, vol. 71, pp. 106, 138, 238). Two tunnels aggregating 400 feet were driven but the vein apparently was not reached. In 1897 the owners, Henry Bratnoble and A. Wartenweiler optioned the mine to Hamilton Smith and associates at an agreed purchase price of $100,000. This deal apparently was not consummated and the property was then bonded to the London Exploration Company. The Daisy tunnel was extended by this company to a total length of 900 feet, striking the vein about 1000 feet below its outcrop (Min. and Sci Press, vol. 75, pp. 30, 170, 434, 598). The vein was found to be 30 feet wide with ore assaying about $10 per ton. The mine closed down in 1898 before any considerable production was realized, apparently because of lease and ownership disputes. Some rehabilitation and development work was done on the mine in 1910, 1914, 1915, and 1917-18. E. C. Loftus of San Francisco had purchased the mine in 1906 (Eng. and Min. Jour., vol. 82, no. 11, p. 513, 1906), a French syndicate held the property in 1910 and ownership had passed to H. C. Callahan of San Francisco by 1914. A small tonnage of ore was milled between 1917 and 1918, ten tons of ore yielding 28 oz. of gold and 40 oz. of silver (U. S. Bureau of Mines records). A 5-stamp mill, separating tables and flotation were employed (Min. and Sci. Press, vol. 114, p. 104, 1917). By 1920 ownership had passed to Percy L. Pettigrew and H. C. Callahan, the mine being idle that year. By 1928 Percy L. Pettigrew had become the sole owner (Castello, 1921, p. 135; Laizure, 1928, p. 113). No mining was done in the 1920s but in 1935 the mine was leased by F. W. Draper. By 1937 a large tonnage of ore had been blocked and a 125-ton mill was being installed (Eng. and Min. Jour., vol. 140, no. 1, p. 70, 1937). During 1939 and 1940 a total of 12,796 tons of ore was milled which yielded 1551 oz. of gold and 6894 oz. of silver worth about $62,000—an average of about $4.74 per ton (U. S. Bureau of Mines records). The total production of the mine is well in excess of $100,000.

The Red Bank mine develops two well-defined veins belonging to the Mother Lode system, the Crown Peak and the Stevenson, as well as several smaller mineralized shear zones. These veins have a general strike of N. 40-45° W. and dip northeast at angles between 50 and 60 degrees. The Crown Peak vein over much of its length follows the fault contact between serpentine and Mariposa slate. The Anderson vein, on the footwall side of the Crown Peak vein, in most places is in slate. Vein matter in the Crown Peak vein commonly is 30 feet thick with ore-bearing parts averaging about 7 feet thick. Milky quartz, quartz-mariposite-ankerite rock and rusty silica-carbonate rock are the usual vein-rock types. The Anderson vein is similar to the Crown Peak but, in general, not so well defined or so thick. Ore minerals are pyrite, argentiferous galena and native gold with minor tetrahedrite, chalcopyrite and sphalerite. Ore milled in 1939-40 carried an unusually high percentage of silver for a Mother Lode mine.

The Red Bank mine has been developed chiefly by crosscut adits that explore the vein for more than 2400 feet of strike length and an inclined depth of over 1000 feet. Because of curvatures in the vein the roughly perpendicular crosscuts are not mutually parallel but trend north or northeast. The Daisy and Stevenson adits give access to the most extensive workings. The workings may be summarized as follows, west to east:

Name	*Length of adit or shaft*	*Length of connecting workings*	*Elevation*
Daisy adit	1821 feet	500 feet	900 feet
Unidentified adit	175 "	180 "	1000 "
Anderson adit	70 "	0 "	? "
Unidentified adit	30 "	0 "	? "
Croesus adit	180 "	40 "	1260 "
Ione adit	660 "	0 "	1005 "
Jubilee adit	370 "	500 "	967 "
Stevenson adit	550 "	500 "	860 "
Shaft on Crown Peak vein	50 "	0 "	1300 "

Red Cloud (Kate Kearney) Mine. Location: Secs. 22, 27, T. 2 S., R. 17 E., M.D., on Bear Creek 3½ airline miles east of Greeley Hill or 10 miles east of Coulterville. Accessible by unimproved dirt road by way of the McDiermid guard station of the U. S. Forest Service. Ownership: Carl Harper, Coulterville, California, owns one claim of approximately 20 acres.

The Red Cloud mine was discovered prior to 1880 but the principal period of operation was 1885-1895 when most of the workings were driven and most of the production made. Castello (1921, p. 135) reports the estimated production to be about $1,500,000 but there are no records to substantiate this claim. In 1885 the mine was owned by Gaines and Carter of San Jose, California (Min. and Sci. Press, vol. 51, no. 7, p. 120, 1885). J. S. Carter was mine manager and R. B. Harper and John Guest were superintendents at various times under Carter. The shaft was down 360 feet late in 1885, was deepened in 1886 to 430 feet and again in 1893 to 700 feet. A 22-stamp mill was operating on the property in 1889 but fell idle soon thereafter, steam-powered. The operator in the middle 1890s was the Red Cloud Mining Company of Boston. Two short ore shoots were followed down to the 500 level during operation by Gaines and Carter, but these were lost between the 600 and 700 levels and the Red Mill Mining Company was reported to have spent $60,000 in fruitless exploration between the 600 and 700 levels (Min. and Sci. Press, vol. 80, no. 11, p. 265, 1900). In 1900 the property was optioned to A. P. Dron of Big Oak Flat but was not put into production. The owner in 1904 was Mrs. E. Whitman of Coulterville (Wilkinson, 1904, p. 13). By 1920 ownership of the mine had passed to Mrs. Emma McDiermid of Coulterville who retained possession of the mine throughout the 1920s. In 1935 the mine was leased for a short time by Fredericks and Hodge of Mariposa. The authors know of no active mining at the property since 1935.

The vein at the Red Cloud Mine strikes N. 40° E. and dips 60-80° north. Wall rocks are slaty metasediments of the Paleozoic Calaveras group. The vein averages about 5 feet wide, locally reaching a width of 15 feet. Vein matter is milky quartz with inclusions of brecciated wall rocks, locally banded or ribboned. Two ore shoots each about 400 feet long were worked in the upper levels to a depth of over 500 feet, ore being 3-5 feet thick. In the middle 1880s ore was running about $30 per ton mostly from native gold. The average content of sulfides was about 2½ percent, auriferous pyrite concentrates running between $100 and $200 per ton (Goodyear, 1888, p. 346). The vein is traceable for a distance of more than 4500 feet and the original property consisted of 3 claims oriented end to end on the main vein and a 4th claim near the east end of the vein at approximately right angles to the main vein. Apparently an intersecting or cutter vein was located in the workings which does not show at the surface.

Mine workings consist of a 8x10-foot inclined shaft 700 feet deep with levels at intervals of 100 feet. Most of the stoping has been done above the 500-foot level. Drifts aggregate more than 500 feet. The workings were all caved and inaccessible in October 1954.

Roma (Piedra de Goza) Mine. Location: Sec. 14, T. 4 S., R. 18 E., 1½ miles south and slightly east of Briceburg. Accessible by less than a quarter of a mile of trail from the Yosemite All Year Highway. Ownership: Frank and Nellie Harris, 595 Tunnel Avenue, San Francisco 24, California, own a patented property containing 25 acres.

The Roma mine was discovered in the 1850s or early 1860s by Spanish Californians and was known in the early days as the Piedra de Goza. Nothing concerning the early production of the mine has been recorded but the early workings were extensive and a substantial early production is probable. After lying idle for nearly 30 years the Roma mine was reopened in 1897 by the Holiday Mining Company directed by T. J. Parsons, G. W. Baker, J. Jacobs et al. with C. G. Rogers as superintendent (Eng. and Min. Jour., vol. 63, no. 7, p. 168). Several tunnels were opened. A 2½-foot vein was struck in the longest of these at a depth of 250 feet from the surface. The mine apparently was idle much of the time in 1898 and 1899 but in 1900 a long tunnel (adit) was started designed to strike the intersection of the Roma and Sierra Rica veins at a point 1400 from the adit portal (Eng. and Min. Jour. vol. 70, no. 6, p. 107, 1900). The Roma and Sierra Rica mines at this time were operated jointly by the same management (Storms, 1900, p. 146). By September 1, 1900, this adit had reached a length of 915 feet and ultimately reached 1000 feet. Its cross-sectional dimensions are 5 by 7 feet and it reached a depth of 600 feet below the outcrop of the Roma vein. Lewis Aubury superintended this operation. Very little work has been done on the mine since 1901. In 1904 the owner was listed as C. Kerrins of Mariposa (Wilkinson, 1904, p. 13). Later ownership passed to Matt Harris and has been held by various members of the Harris family up to the present time.

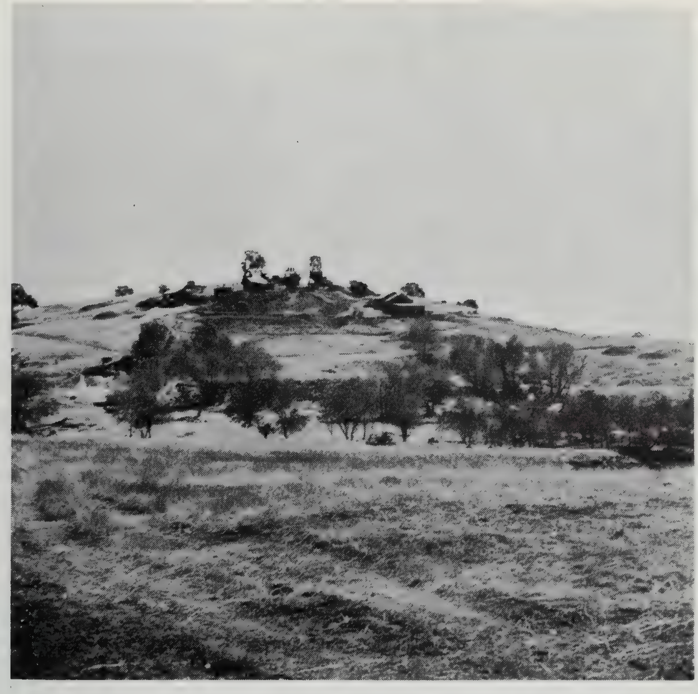

FIGURE 39. The Ruth Pierce gold mine in the Hornitos district. Photo taken from beside the Hornitos-Mt. Bullion road with the observer facing south. The main Ruth Pierce vein extends across the hilltop from side to side of the photo and is well exposed where it crosses the road to the left of the photo. About $600,000 has been taken from this mine.

The main vein at the Roma mine averages 2 to 2½ feet wide locally thickening to as much as 5 feet. It strikes slightly north of east, dips 60-70° S. and is a continuation of the vein crossing the adjacent King Solomon claim. The wall rocks are massive pyroxene andesite greenstones of unknown age. Adjacent to the vein there has been rendered slaty to schistose by intense shearing.

Rutherford and Cranberry (Perrin and Craigue) Mine. Location: Secs. 15, 22, T. 3 S., R. 19 E., M.D., just north of the Merced River and Highway 140, 4 miles by road west and slightly south of El Portal. Ownership: L. G. Goodrich, 1522 State St., Santa Barbara, California, owns a fractional claim, the Rutherford, containing 10.34 acres. Ownership of other claims of the Rutherford and Cranberry group were not determined.

The Rutherford and Cranberry mines are contiguous properties operated throughout much of their history under the same management. The Rutherford mine, closest to the Merced River, was discovered about 1863, probably by the Rutherford brothers. As early as 1865 there was a water-powered, 5-stamp mill on the Rutherford mill site (Min. and Sci. Press, vol. 10, no. 11, p. 163, 1865). According to Castello (1921, p. 112) the Cranberry mine, situated high on the hill north of the Rutherford mine, was discovered in 1863 and patented in 1873. The Rutherford mine was patented in 1874 (Laizure, 1928, p. 114). In 1867 a 50-foot shaft was sunk to connect with one of the tunnels. At that time ore ran $40 per ton as well as other miscellaneous workings. In 1868 the Rutherfords sold the properties to undisclosed individuals from San Francisco. By 1875 ownership was held by Perrin and Craigue with S. W. Craigue acting as mine superintendent. The mines were intermittently active until the summer of 1880 when the mine was closed down because of disputes among the owners. In 1879 ore was averaging about $10 per ton, but occasional masses of ore were found that ran as high as $4500 per ton. The principal owners in 1884 were Capt. A. H. Ward and S. W. Craigue. These individuals constructed 2 water-powered arrastras and considerable rich ore was taken from the Rutherford mine from a depth of about 70 feet. In 1885 a rich ore shoot was discovered in the Cranberry mine in a new crosscut driven about 500 feet southeast of the main shaft and on the opposite side of the ridge at a depth of 100 feet below the vein outcrop. At the time of the new discovery, the two arrastras each were milling 1 ton of rock per day which returned $34.60 per ton, mainly from ore taken from the old Cranberry shaft (Min. and Sci. Press, vol. 51, no. 14, p. 232, 1885). The vein encountered was described as 11 feet wide and very rich, but no statement as to the tenor of the ore was made.

Mining on the Rutherford property apparently was discontinued for a long period and effort was concentrated at the Cranberry mine. By 1888 the new ore-shoot had been developed for a length of 400 feet and a vertical depth of 320 feet by shaft and winze. The ore-shoot was described as 4 feet wide (Goodyear, 1888, p. 348; Storms, 1896, p. 217). Mining continued until about 1896 after which the property lay idle until 1927. A. H. Ward held ownership until the middle 1920s when the property passed into the hands of F. E. Bass of San Francisco. During that year Bass leased the property to R. A. Frederick of El Portal and considerable drifting was done on the Rutherford vein (Laizure, 1928, p. 114). There is no record of production for this period. About 1935 the property was leased by Yosemite National Gold Mines Company, John C. McGarry, manager (Laizure, 1935, p. 43). A new 200-foot shaft was sunk and considerable drifting done on the 200-level. In July, 1954, there was a good cabin on the Rutherford property, but no equipment, and the mine workings were inaccessible because of minor caving.

Although no production records are available for the Rutherford and Cranberry group of mines the total yield must have been impressive. The lowest grade of ore mined apparently ran about $10 per ton at the old price of gold and Laizure (1928, p. 114) states that several shoots averaged $20 per ton. Much ore ran considerably higher, particularly in the upper 100 feet of the veins where the ore was oxidized and enriched through removal of sulfides. Pyrite concentrates assayed $35 to $40 per ton in the late 1880s (Goodyear, 1889, p. 348). There is no indication that the veins were worked out and the total depth reached, about 320 feet, does not adequately explore the veins encountered on either the Rutherford or Cranberry properties.

There are two sets of veins at the Rutherford mine, one striking N. 10-15° E. and dipping 75-80° west and the other striking about N. 75-80° E., and nearly vertical. Some work has been done on at least four north-trending veins and one or more veins trending nearly east. Wall rocks are coarse-grained biotite granodiorite or quartz diorite cut by narrow dikes of fine-grained hornblendic quartz diorite. Vein matter is milky quartz with native gold, pyrite, arsenopyrite and galena. Pyrite makes up about 25 percent of the ore below the zone of oxidation (Goodyear, 1888, p. 349). The main vein is 1 foot to 5 feet wide averaging 3 to 4 feet. Others are thinner and less persistent along the strike.

Workings at the Rutherford property consist of a main drift adit with connecting shaft, a 200-foot shaft with workings on the 200-level and several less extensive adits. None of these were accessible to the authors in July, 1954. The shaft connecting with the main adit (located a short distance northwest of the cabin) has one level between the shaft collar and the haulage adit and both levels are connected to extensive stopes. The adit was 460 feet long in 1921 (Castello, p. 136). The 200-foot shaft sunk in 1935 could not be identified in July 1954 and presumably is caved at the collar.

At the Cranberry mine, about half a mile north and slightly west of the Rutherford mine workings, the main vein strikes roughly N. 50° W. and dips northeast at 40-50°. It averages 4 or 5 feet wide locally reaching widths of 11 feet. The vein cuts coarse-grained granitic rocks containing small pendants of dark slate, schist and hornfels. Topography is exceedingly rugged. Workings include 3 drift adits, all over 200 feet long and the longest at least 700 feet. The long tunnel connects with an 80-foot shaft (Castello, 1921, p. 136). Storms (1896, p. 217) also mentions a connecting 200-foot shaft 500 feet from the adit portal. There is a crosscut adit 500 feet southeast of the old shaft on the opposite (east) side of the ridge which cuts the vein at a depth of 100 feet below the outcrop (Min. and Sci. Press, vol. 51, no. 14, p. 232, 1885). This connects with extensive drifts and stopes. All of these workings are partially obscured by cave-ins and none had been entered recently in July 1954.

Schoolhouse Mine. Location: Center sec. 10, T. 4 S., R. 16 E., M.D., in the central part of Hunter Valley about 7 airline miles northeast of Hornitos. Accessible via the paved Hornitos-Bear Valley and Hunter Valley roads. Ownership: Frank A. Maschio and John Maschio, Merced, California, and Joe Maschio, Snelling, California own one patented claim, a part of the patented Maschio Ranch.

The Schoolhouse mine is an old property which had extensive workings and dumps prior to 1912. During 1912 and 1913 the property was operated under bond by G. P. Gow of Berkeley with W. Taylor acting as superintendent (Eng. and Min. Jour., vol. 94, no. 21, p. 1002; vol. 95, no. 21, p. 1071). A 2-stamp mill was placed in operation crushing ore from old dumps. About 1916 some work was done by Milton Sutherland of Atwater, but soon closed because of disputes. The mine was reopened by Sutherland in 1923 and some very rich ore was taken out from 2 levels (Laizure, 1928, p. 115) between 1923 and 1925. A small production was recorded in 1931 (U. S. Bureau of Mines records) since when there has been little or no activity at the mine.

Mine workings are along the southeast extension of a prominent vein system locally known as the Blue Lead, which strikes N. 30-35° W. and dips about 60° E. The vein system cuts pyroxene andesite greenstone containing bands of red chert, these rocks belonging to the Upper Jurassic Amador group. Gold occurs in pockets in dark, bluish quartz. The principal working is a 60-foot inclined shaft serving two levels of undetermined length but the shaft is caved and the headframe has been removed. A blacksmith shop remains on the property. There had been no recent activity in June 1954.

Schroeder (Home) Group. Location: Sec. 16, T. 4 S., R. 18 E., M.D., on high ground west of Saxon Creek Canyon 3 airline miles northwest of Colorado School and 6½ airline miles north of Mariposa. Accessible by 2½ miles of unimproved dirt road from the graded Saxon Creek-Sherlock Creek road. Ownership: C. M. and R. E. Schroeder, Box 169, Mariposa, California own the patented Schroeder placer claim of 20 acres and 8 other unpatented claims including the Home, Rex, Missing Link, New Deal, Caldwell, Apex, Independence and Nelly Bly claims.

The Schroeder group of claims was discovered in the late 1870s or early 1880s by John Schroeder. The first sustained mining apparently began about January 1883 with hydraulicking and ground sluicing of soil and the upper weathered parts of the veins. Numerous sizeable nuggets and a great deal of fine gold was recovered, enough to finance construction of a ditch and pipeline as well as other miscellaneous equipment. In June 1883 the county was engaged in surveying for a pipeline designed to insure an adequate water supply for hydraulicking operations at the Schroeder and adjacent Schantz mines (Min. and Sci. Press, vol. 46, no. 22, p. 372, 1883). By May 1886 hydraulicking and ground sluicing operations had laid bare a blanket vein dipping 30-35° to the east (Min. and Sci. Press, vol. 52, no. 18, p. 288, 1886) as well as several other veins, and it became necessary to explore the property underground. During the middle 1890s the mine was sold to F. W. Keeney of San Francisco, J. A. Schroeder remaining as superintendent. A new mill was erected about this time. By April 1898 the mine had been bonded to W. Price who recovered a piece of ore weighing 13 pounds which yielded $2,000 (Min. and Sci. Press, vol. 76. no. 16, p. 422, April 16, 1898). Storms (1896, p. 223) describes the veins as pockety. Nevertheless 483.75 oz. of gold were produced from the mine during 1896 from an undisclosed quantity of ore (U. S. Bureau of Mines records). Between 1900 and 1906 approximately 133 tons of ore was mined which yielded 595.51 oz. of gold and 12 oz. of silver for an average of approximately $90 per ton.

In 1915 the mine was being operated by J. A. and C. J. Schroeder, P. W. Judkins and C. H. Weston (Lowell, 1916, p. 596). They installed a 5-foot, 20-ton Huntington mill. At that time the principal working was an open cut 200 feet long and 30 feet deep, but about 375 feet of drifts had been driven. By 1920 the open cut had been enlarged to 400 feet long and 60 feet deep. At present it can hardly be recognized from other gulches in the vicinity.

The Schroeders, Judkins and Weston retained ownership of the property through the 1920s but did very little work on it. In 1932 some production was recorded, apparently by the Schroeders and in January 1934 the mine was taken lease by Ashworth and Pehrson of Mariposa (Laizure, 1935, p. 44). Ownership has remained largely in the Schroeder family to the present time and there has been a substantial intermittent production of ore averaging slightly over 1 oz. of gold per ton. In the fall of 1954 intermittent mining was being carried on from a northwest-trending adit about 150 feet above and southwest of the mill but there was no one on the property at the time of the authors' visit.

Recorded production of the Schroeder group of mines since 1896 is $158,400 as calculated from U. S. Bureau of Mines records. Inasmuch as this does not include the very substantial production of the 1880s and early 1890s the total production of the group must be between $200,000 and $300,000.

By far the greatest production from the Schroeder group of mines has been from residual soil mantle and from the weathered, fragmental upper parts of the several veins which cut the property. A system of relatively narrow, more or less parallel, north-trending veins crosses the property. Most of these veins have a very steep east dip. Cutting this system is a somewhat discontinuous blanket-vein varying from a few inches to 3 feet wide. This dips east at angles varying from 15° to nearly 35°. Wall rocks are massive, schistose and slaty pyroxene andesite greenstones derived partly from tuff and partly from massive flows and dikes. The greenstones are of probable Paleozoic age. The schistosity of the greenstone, where well developed, strikes N. 60° W. and dips very steeply southwest.

In 1935 the principal working was an adit 215 feet long and a 15° inclined shaft 35 feet deep (Laizure, 1928, p. 44). In August 1954 there was a long adit driven southwest (N. 60° E.) from a point just west of the mill building and at the same level as the building. There are several adits of various lengths higher up the ridge from this lower adit that trend N. 30-40° W. The lower adit was not in active use, most of the current development work being done on the upper adit located nearest a small cabin or tool shed. This was not entered, in the absence of the owners, but was at least 150 feet long.

The mill includes a 5-foot diameter, 20-ton capacity Huntington crusher and appeared to be in running condition. There is also a serviceable compressor and compressor house and other miscellaneous mine buildings.

Silver Lead (St. Gabriel and Honeycomb, Silver Lead and Margaretta) Mine. Location: Sec. 28, T. 4 S., R. 16 E., M.D., 4½ miles north and slightly east of Hornitos. Accessible by 1½ miles of unimproved dirt road from the paved Hornitos-Bear Valley road. Ownership: E. G. Branson, et al., c/o Horace Meyer, Cathay, California owns two patented claims the Silver Lead and Margaretta totaling 39.84 acres. Property originally included the St. Gabriel and Honeycomb claims but these may have been re-named.

The Silver Lead mine was first discovered in the 1860s (Castello, 1921, p. 138) but was only active at wide intervals up to 1914. In 1880 some work was done at the mine by A.S.F. Company (Min. and Sci. Pres, vol. 40, no. 23, p. 357, 1880) but there is no record of production. In 1901 it was bonded for a short time to Richard O'Brien. In 1914 the property was acquired by the Mariposa Mining and Milling Company of Carson City, Nevada, with W. A. Bradley acting as mine superintendent (Lowell, 1916, p. 597). At that time Lowell reported the workings to consist of a 240-foot shaft with 422 feet of drifts. Bradley put a 5-stamp mill into operation and a moderate production of medium and low-grade ore was recorded. About 1919 the management was reorganized under the name Simpson Mining Company, W. A. Bradley remaining as superintendent, but this company ceased operations in 1922 (Laizure, 1928, p. 117). About 1935 the St. Gabriel and Honeycomb claims were taken under lease by the Sanchez Brothers of Hornitos (Laizure, 1935, p. 45) and there was some production by lessees up to 1947. There was no activity and no equipment at the property in July 1954.

Ore occurs in a narrow vein of glassy to milky quartz accompanied by a zone of quartz stringers 2-4 feet wide. The mineralized zone strikes about N. 30° W. and dips 40-45° northeast. Wall rocks are chiefly dense, massive, blue-black quartz-biotite hornfels and massive spotted slate. These apparently are cut at depth by green metavolcanic dikes and dark, quartz-rich granodiorite porphyry dikes. None of these crop out conspicuously at the surface. Both the metasediments and intrusives are of Upper Jurassic age. Ore minerals, in addition to finely divided native gold, include pyrite, chalcopyrite, galena, sphalerite, and arsenopyrite. The silver content is no greater than most other gold ores of the Sierran foothill belt. Ore milled during the later periods of mining yielded $4-7 per ton. The principal working at the Silver Lead mine is an inclined shaft at least 250 feet deep serving 2 or 3 levels. This was flooded to within 50 feet of the collar in August 1954. In 1928 there were two levels aggregating about 500 feet (Laizure, 1928, p. 138). There are several short tunnels and shallow shafts and pits in a line extending northwest for about a quarter of a mile. The tunnel workings are both sides of a ravine which cuts across the trend of the vein system.

Spread Eagle Group (Farmers Hope, Miners Hope, Empire, Mohawk, Monarch, Fanny, Little Charlie, Tollgate, Bonanza). Location: Secs. 29, 31, 32, T. 4 S., R. 18 E., M.D., near the Whitlock Creek-Sherlock Creek road 4 airline miles north and slightly west of Mariposa. Accessible from State Highway 49 via 5 miles of graded dirt road and half a mile of unimproved dirt road. Ownership: Mack C. Lake, c/o Carlo S. Morbio, 58 Sutter St., San Francisco, California owns a property patented in 1934 which includes the Empire, Fanny, Little Charlie, Miners Hope (Farmers Hope), Mohawk, Monarch, Spread Eagle and Tollgate claims and the Empire millsite, a total of about 100 acres.

The Spread Eagle group of mines was discovered between 1850 and 1860 as an aftermath of placer-mining on Whitlock Creek (Julihn and Horton, 1940, p. 148). They are a consolidation of numerous claims separately owned in early days but gradually consolidated under one ownership. In 1896 the Farmers Hope (later called the Miners Hope) was owned by J. J. Ellingham and in 1903 by Ellingham and Grove—operated under bond to E. Waters and Sons who had a 5-stamp mill. The Farmers Hope was also extensively developed in 1905 by Stolder and Dussel, presumably under lease or bond, in conjunction with an adjoining claim called the Bonanza.

The Spread Eagle mine was operated in the late 1890s and early 1900s by Jacob Teats (also spelled Teets). Teats bought and installed a 2-stamp mill on the claim in the summer of 1904 (Eng. and Min. Jour., vol. 75, no. 3, p. 102, 1903). In August 1904 the Spread Eagle mine was under lease to Nevills and Hanna who took out 28 tons of ore which yielded $120 per ton (Eng. and Min. Jour., vol. 78, no. 5, p. 197, 1904).

By 1915 ownership of the Farmers Hope group of seven lode and two placer claims and one millsite had passed to G. L. Kennedy of Mariposa, and Nick Mullins of Whitlock held two claims under the name Spread Eagle mine (Lowell, 1916, p. 582, 597). At that time the Farmers Hope group was inactive and the Spread Eagle was active under lease. On January 1, 1916 the Farmers Hope claim was relocated by Nick Mullins and renamed the Miners Hope, assessment work having been allowed to lapse on the Farmers Hope group of claims (Castello, 1921, p. 126); Mullins held both the Miners Hope and Spread Eagle groups of claims until 1927 when they were reported sold to Belle McCord Roberts of Long Beach (Consolidated Gold Fields of Mariposa, Laizure, 1928, p. 117), but little or no mining was done under this ownership.

In the spring of 1934 the Spread Eagle—Miners Hope group of mines was reopened by Whitlock Mines Corporation under the management of Martin Tresidder and a 5-stamp mill was put into operation (Laizure, 1935, p. 38). The Whitlock company and later a leasing partnership of Martin Tresidder and R. C. Poor made a substantial production from the property between 1934 and 1939 from ore running slightly less than a quarter of an ounce of gold per ton (U. S. Bureau of Mines records). There has been no recorded production from the mines since 1939.

The following discussion on the geology and mine workings is drawn chiefly from Julihn and Horton (1940, pp. 148-150) the last authors to visit the mines while they were in operation. "The principal workings are on two nearly parallel veins that strike almost due north but diverge at depth. The Spread Eagle dips about 45° E., and the Miners Hope, which outcrops 600 to 700 feet to the west of it, dips about 60° E. . . . The average width of the Spread Eagle vein is about 20 inches but in stoped areas it has been considerably wider, up to a maximum of 7 feet. Both walls are greenstone. The ore consists of quartz carrying gold, pyrite, chalcopyrite and occasional galena, the sulfides composing about 1 percent of it. Above the adit level, which corresponds closely with the water level, the ore was almost wholly free-milling, while below it about one-fourth of the gold is contained in sulfides, the concentrates from which average about $250 per ton. The ore mined above the adit level averaged about 1 ounce of gold per ton, but the vein contained frequent pockets of high-grade, and 2- and 3-ounce ore was not exceptional. It is of interest that ore shoots were found at two places where the vein bends sharply to the east. . . ."

"The early workings of the Miners Hope included numerous deep trenches, shallow pits, and adits extending over 1000 feet along the vein but principally within 600 feet of the northern end of the claim. There the vein is said to have averaged over 4 feet in width for at least 300 feet, attaining a maximum width of 12 feet in one stope. South of this section, however, its width was 14 inches to 2 feet. The vein follows rather closely the contact of a schist (schistose greenstone) on the footwall and greenstone on the hanging wall. . . . The ore shoots are said to have been associated with small fissures coming through the schist to an abutment with the greenstone. Some of these fissures contained a fine-grained dike rock.

"In the Fanny claim west of Whitlock Creek is a strong quartz vein said to show no gold at the surface; but on the Milburn claim adjoining it on the south, good ore has been discovered . . . in the same vein.

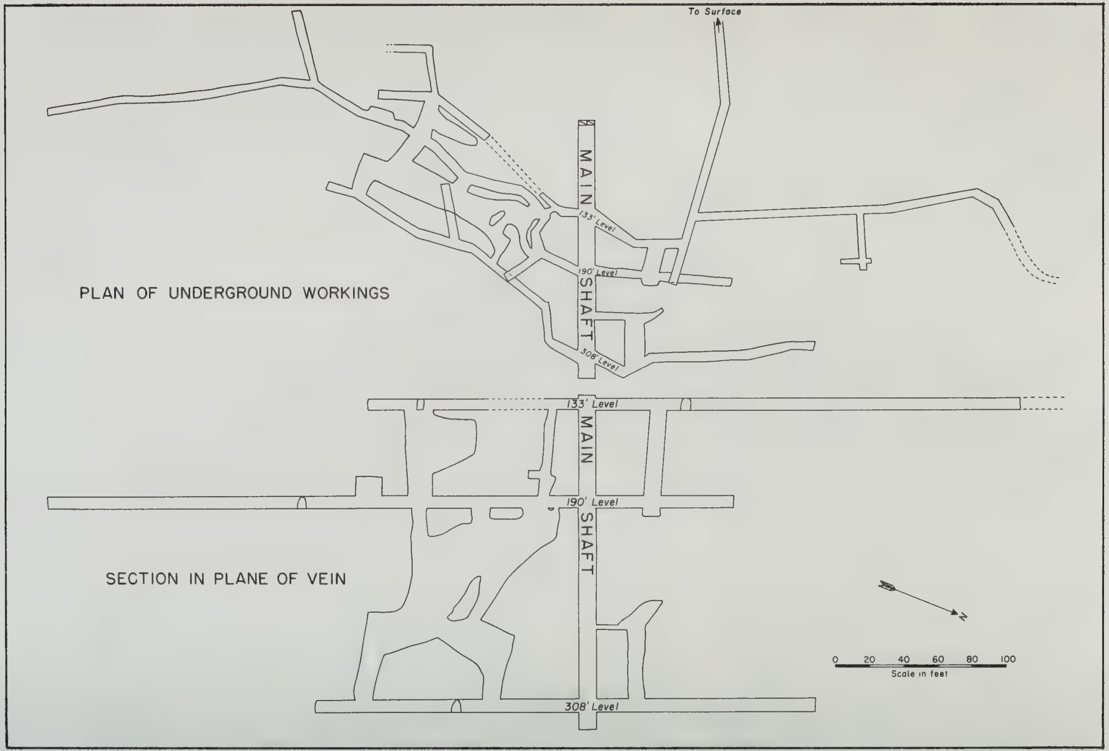
To Surface
MAIN SHAFT
133' Level
190' Level
308' Level
PLAN OF UNDERGROUND WORKINGS
133' Level
MAIN SHAFT
190' Level
308' Level
SECTION IN PLANE OF VEIN
N
0 20 40 60 80 100
Scale in feet

FIGURE 40. Longitudinal section of the workings of the Miners Hope mine in the Whitlock Creek district, one of the mines of the Spread Eagle group The Spread Eagle group of mines, with a production of about $425,000, is noted for its pockets of high-grade ore. *Reproduced from a drawing by Bains and Tressider by courtesy of Thomas M. Bains III.*

In the Empire claim south of the Miners Hope, is a small vein called the Dolph, which is said to have produced $25,000. It lies about 100 feet east of the southern extension of the Miners Hope vein and dips 70° E. The Mohawk claim contains the northerly extension of the Whitlock vein, one of the famous early producers of the district.''

The principal workings on the Spread Eagle vein are a 5- x 8-foot inclined shaft 345 feet deep, intersected by an adit at a depth of 125 feet (as measured along the dip of the vein). A drift driven at adit level both ways from the shaft is about 1000 feet long and has about 150 feet of auxiliary workings. There are about 1250 feet of drifts below the adit level. The upper part of the shaft is caved and most of the other workings were in need of cleaning out in August 1954.

On the Miners Hope vein the most recently used important working is a 2-compartment inclined shaft 328 feet deep as measured on the dip. It connects with an east-driven crosscut adit striking the vein at an inclined depth of 133 feet. These workings are about 800 feet from the north endline of the Miners Hope claim. The shaft has drift levels at 138, 190 and 308 feet (see accompanying plan and section). The 133-foot level extends more than 200 feet north and 200 feet south of the shaft but in 1939 was caved beyond these distances both north and south. Nearly all of the ore encountered above the 138-level has been mined. The 190-foot level extends north of the shaft 85 feet and 367 feet to the south. The 308 foot level consists of a 133-foot north drift and a 188-foot south drift. Neither the 190- nor 308-levels reached the region of stoping done from the 133-level north of the shaft, although the 308-level was within 100 feet of the stoped area in 1939 (Julihn and Horton, 1940, p. 150). According to these authors only about half of the ore between the 133- and 308-levels north of the shaft has been stoped. In 1937 an ore shoot 90 feet long was discovered on the 308-foot level and this was mined up to the 133-foot level. Its length decreased rapidly above the 190-foot level. Twenty-five hundred tons of ore was produced from this shoot which carried about $9.70 per ton, but only $7.20 was recovered by amalgamation. Seven-tenths of one percent of the ore from this shoot was auriferous pyrite sampling about 10 oz. of gold per ton of concentrate, on the average. Unfortunately the concentrates were lost in a storm.

Up to 1940 the best available information gathered by Julihn and Horton indicated the total production of the mines now included under the Spread Eagle group (including the Empire and Fanny mines) to be $425,000. No further production has been recorded since that time. Production reported to the U. S. Bureau of Mines for the period 1893 to 1955 aggregates approximately $100,200 in gold and silver. A small amount of copper was recovered in 1914 from the Spread Eagle mine. The ore milled before 1934 averaged a little over half an ounce of gold per ton and that mined in the 1930s ran approximately 0.26 oz. of gold per ton.

Sweetwater II Mine. Location: Secs. 17, 20, T. 4 S., R. 19 E., M.D., on the west side of Sweetwater Creek 2 airline miles northwest of Jerseydale and half a mile northwest of the Early mine. Accessible from the paved Darrah-Jerseydale road via 3 miles of graded dirt road. Ownership: Hudson River Gold Mines, Ltd., c/o H. Vandel, P. O. Box 76, San Rafael, California, owns the Sweetwater, Crocker, Douty, Douty

Extension, Green, Sugar Pine 1 and 2, Gage, Gage Extension, Reddington, Berger and Wallace Amended lode claims and the N.I.R.A. placer claim.

The Sweetwater mine was discovered prior to 1884 but has been worked intermittently at widely spaced intervals. In 1903 the owners were E. J. and L. E. Hanchett with J. W. Jones as superintendent. A new 10-stamp mill was put into operation in 1905 but no production was recorded for the period 1903-1905. In 1914 the mine was reopened and developed by a man named McAllister. Two tons of selected ore mined by McAllister yielded 9 oz. of gold and 4 oz. of silver (U. S. Bureau of Mines records). In 1917 the mine was sold to E. C. Gamble and W. S. Stewart of Oakland who did some exploration but no sustained mining. By 1919 it had passed into the hands of the Dominican Mining Syndicate Inc., Coalinga, California (H. L. Schultz, Pres.) with M. Gamble acting as superintendent. The 10-stamp mill was overhauled (Castello, 1921, p. 118) but little or no production was realized from the mine. By 1928 the mine had been acquired by C. A. McCartney of Jerseydale who sold it that year to Frank Zuhosch and associates of San Francisco (Laizure, 1928, p. 118). Late in 1933 the property passed to the present owners. Between 1934 and 1937 approximately 300 tons of ore was milled which yielded 70 oz. of gold and 189 oz. of silver (U. S. Bureau of Mines records). Lee Rowland leased the mine in 1941 and 1942 and took out 32 oz. of gold and 6 oz. of silver from 9 tons of hand-picked ore. The mine was being operated under lease to Clyde Foster in the fall of 1954.

The Sweetwater vein averages close to 3 feet thick, strikes N. 55° W. and dips 13° to 27° near the surface. According to Castello (1921, p. 118) the vein dips 45° at depth. The thickness of the vein is very irregular and the ore is pockety. Vein matter is mainly glassy to milky quartz with native gold and pyrite. Concentrates produced in 1934-37 ran from $148 to $112 per ton, the tonnage of ore represented not being recorded (U. S. Bureau of Mines records). Wall rocks are coarse-grained, hornblende granodiorite or quartz diorite strongly weathered to depths as great as 50 feet. Much of the soil mantle above the vein is gold-bearing but the considerable clay content makes this ground difficult to handle. Some placer-mining has been done on the soil mantle. Pendants of slate probably belonging to the Paleozoic Calaveras group crop out northwest of the mine workings.

At present the mine is entered by a 600-foot crosscut adit which connects with a 350-foot southeast drift and an 800-foot northwest drift. There is an old inclined shaft 170 feet deep with a 123-foot level which was caved and not in use in August 1954. The drifts from the adit level had not been wholly cleaned out by the present operator in August 1954. There are also several extensive stopes which have not been recently explored. There is part of a 10-stamp milling installation on the property which might be rehabilitated.

The production record for the Sweetwater mine is fragmental and no reliable estimate can be made. Most of the ore appears to have been mined prior to 1903 but the ore mined since that time has been of considerably better than average grade.

Texas Hill (Carrie Todd, Texas) Mine. Location: Secs. 7, 8, T. 3 S., R. 18 E., M.D., high on the east wall of the North Fork of the Merced

River Canyon 2 miles southwest of Kinsley guard station of the U. S. Forest Service. Accessible from either Briceburg or Coulterville by way of the graded Kinsley road and 2½ miles of unimproved dirt road (Ponderosa Way). Ownership: G. Ross Frank and Mary E. Shell, c/o W. J. Beatty, Coulterville, California own the patented Carrie Todd claim of 20.66 acres and several adjoining unpatented claims.

The Texas Hill mine, first called the Texas mine and later the Carrie Todd was discovered about 1865 and produced intermittently in a small way up to the 1900s. In 1882 Francisco Bruschi bonded the property to Gilbert Douglass of Seth Cook and Company (Min. and Sci. Press, vol. 45, no. 26, p. 405, 1882) but no great amount of work was done at that time. It passed into the hands of Mrs. Hannah Douglass and remained under her ownership until the middle 1920s. A small production, presumably by leasers, was recorded in 1912-15. In 1919 the property was under bond to Milton Fraser of Kinsley and Mr. Sain of Coulterville who were in process of constructing a 10-stamp mill (Castello, 1921, p. 110). Estelle I. Fraser and George Frank of Coulterville acquired the mine in the middle 1920s. In 1927 the property was taken over for a short time by the Gentry Gulch Consolidated Mines Company of San Francisco, Thomas I. Box, president (Laizure, 1928, p. 82). In March 1934, the Texas Hill Mining Company of San Francisco, P. J. McLaughlin, president, leased the mine and operated it until about 1937. Leasers operating under ownership of G. D. Frank worked the mine from 1941 to 1943 since when the property has been inactive.

The known production of the mine is about $74,000 (McLean, W. D., personal communication, 1956). Ore produced in 1941-43 averaged about a third of an ounce of gold and a fifth of an ounce of silver per ton, plus a little copper and lead. Prior to that time the ore had run approximately $20.00 per ton based on the present price of gold.

The principal (Carrie Todd) vein at the Texas Hill mine averages 2-4 feet wide, strikes roughly east and dips 70-75° north. There are at least two minor parallel veins on the property developed by superficial workings. The veins cut dark slate and quartz-biotite hornfels probably belonging to the Paleozoic Calaveras group of metasediments. The Carrie Todd vein is developed by three drift adits each several hundred feet long. A winze connects the lower and middle tunnels (No. 2 and No. 3). The most recent work apparently was done from the No. 2 tunnel. Ore shoots are about 150 feet long and average about 2 feet thick.

Tyro (Rittershoffen) Mine. Location: Secs. 9, 10, T. 3 S., R. 16 E., M.D., 1¼ airline miles southwest of Coulterville. Accessible by 1½ miles of dirt road via the Malvina mine. Ownership: Louise A. Ward and Laurence Eaton, P. O. Box 223, Ross, Marin County, California own one patented claim of 20.15 acres.

The Tyro mine was probably discovered in the early 1850s at about the same time as the Malvina group. Although there were some workings prior to 1889, most of the development work and mining was done by the Tyro Mining and Milling Company under the management of Charles Sutherland and J. McLaughlin. The company was incorporated in 1889 (Eng. and Min. Jour., vol. 47, no. 20, p. 462, 1889). By 1895 the inclined shaft had reached the 600-level and drifts were being run on the 500-level (Eng. and Min. Jour., vol. 60, no. 6, p. 132). The shaft was deepened to the 700-foot level in 1896 and by the end of

1897 more than 1870 feet of drifts had been run. The company operated a 10-stamp mill. There were several changes of management during the late 1890s and the mine fell idle for several years. In 1902 and 1903 Thomas J. Brown operated the mine and rehabilitated the mill but no sustained mining was done (Eng. and Min. Jour., vol. 73, no. 15, p. 530; vol. 76, no. 15, p. 54). In 1909, McClure Gregory operated the mine for a short time but management again reverted to Joseph Buttgenback, a former president of the Tyro Mining and Milling Company, later that year. There has been little or no production from the mine since 1897. The workings were inaccessible and there was no equipment on the property in September 1954. The estimated production from 1893 to 1897 was $110,000 (Logan, 1935, p. 190).

Both the Tyro and the Malvina group of mines are on the west branch of the Mother Lode, the vein system at the Tyro mine being a continuation of the one that crosses the Malvina group of claims. It strikes about N. 20° W. on the Rittershoffen claim and dips from 60 to 70° northeast. Vein matter is largely milky quartz 2 to 7 feet wide. Ore shoots generally occur in a ribbon structure of quartz interleaved with thin sheets of wall rock (Fairbanks, 1890, p. 39). In addition to finely divided native gold there is considerable auriferous pyrite and chalcopyrite. Fairbanks also mentions the presence of covellite. The principal ore shoot was found between the 600- and 700-foot levels. This was at least 80 feet long and more than 100 feet deep. Most of the ore on the 700-foot level ran $20 per ton at the old price of gold and some ran as high as $500 per ton (Min. and Sci. Press, vol. 72, no. 13, p. 250; vol. 73, no. 11, p. 222).

The principal workings are an inclined shaft 700 feet deep with 6 levels and about 1870 feet of drifts (Logan, 1935, p. 190). Most of the ore has been stoped between the 600 and 700 levels in the main ore shoot and there has been considerable near-surface stoping, particularly north of the main shaft. In September 1954 this shaft was open to a depth of about 70 feet and there were several openings into the near-surface stopes. One of these may have been an old shaft. There has been no recent activity at the mine.

Virginia (Virginia-Belmont, White Gulch, Captain Aiken) Mine. Location: Secs. 13, 14, T. 3 S., R. 16 E., M. D., just west of Highway 49 about 4 miles south of Coulterville. Accessible from Highway 49 by a quarter of a mile of unimproved dirt road. Ownership: Sam E. Wells, 7533 Cecilia Ave., Downey, California, owns a patented property of 72 acres which includes the Virginia No. 2, Belmont, Claremont, Angus and Piedmont claims. Once included the Coe Gulch placer claim.

History: The Virginia mine was discovered by a group of miners in 1850 but was not extensively developed by them. Through the 1860s it was owned by Captain J. M. Aiken and was known as the Captain Aiken mine. Late in 1879 it was acquired by Senator Coe of New York. Coe and Lewis White sunk a shaft and drove a connecting adit during the winter of 1879-1880 and were reported to have taken out enough ore to pay for the mine (Min. and Sci. Press, vol. 39, no. 26, p. 413, 1879). During 35 days of mill operation during the spring of 1880 over $20,000 was recovered, and one pocket of specimen ore containing large flakes and stringers of gold yielded $10,000 (Min. and Sci. Press, vol. 40, no. 23, p. 357, 1880). The mine apparently remained under operation of

Coe until about 1884. Production under Coe is supposed to have been $100,000 (Min. and Sci. Press, vol. 75, no. 16, p. 366). The property fell idle between 1884 and 1888 but late in 1888 was bonded to Colonel Cook of Big Oak Flat, representing eastern interests. Cook unwatered and explored the mine but decided against reopening (Min. and Sci. Press, vol. 57, no. 18, p. 292, 1888). In 1894 the owner was listed as the Virginia Mining Company of Springfield, Ohio. Between 1894 and 1896 the property was described as in litigation (Storms, 1896, p. 224) but was leased, for a short time in 1895 to McKenzie, Hoxie and Donahoe. Late in 1895 the litigation apparently was settled and O'Toole and Arnold of San Diego emerged as owners—at a purchase price reported to be only $5,000 (Storms, 1896, p. 224; Min. and Sci. Press, vol. 75, no. 76, p. 366, 1897). In January 1896 a find of rich ore was reported. Later that year the mine was bonded to Paul Blackmar and the well known Clarence King, and was reactivated under the direction of J. J. Dolan in the summer of 1896 (Eng. and Min. Jour., vol. 62, no. 2, p. 36, 1899). This management was short lived and on January 1, 1897 the property was bonded by the California Exploration Company, Ltd. from O'Toole and placed under the superintendency of R. A. Parker. This company completed a 10-stamp mill and made considerable production before ceasing operations in the summer of 1898 because of a shortage of water. At that time the shaft was 470 feet deep and ore was milling $5.50 to $10 per ton (various issues of Min. and Sci. press).

In 1904 O'Toole operated the property under the name Virginia Gold Mining Company and produced 1000 tons of ore which returned about 0.74 oz. of gold per ton (U. S. Bureau of Mines records). In October 1907 the property was transferred to Garnett and Priest of Kansas City and T. W. McLean of Boise City, Idaho, McLean acting as mine manager. About 2000 tons of low grade ore were produced by the management but the operation again ended in litigation. S. E. Lewis of the Crown Lead mine leased the property for a time in 1912 but no production was recorded. In the spring of 1913 the mine was acquired by the White Gulch Mining Company of Oakland, a subsidiary of the Procter and Gamble Company (Min. and Sci. Press, vol. 95, no. 16, p. 826, 1913; Logan, 1935, p. 190). It was cleaned out and placed in operation under the direction of C. C. Powning of Oakland. Extensive development and production followed. By 1918 this company had deepened the shaft to more than 700 feet and water became a serious problem for the first time. Mining, however, was continued to a depth of 1000 feet and a large tonnage of ore was milled which averaged slightly more than 0.4 of an oz. of gold per ton. The White Gulch Mining Company ceased operations in 1920 and the Virginia Belmont Mining Company was organized in Nevada to continue operations on the deeper levels of the mine. W. V. Wilson was mine superintendent and B. C. Austin the consulting engineer for this company. This enterprise lasted until May, 1923, the shaft having been deepened to 1050 feet. Early in 1927 an unsuccessful attempt to reopen the mine was made by a group known as the Virginia Lode Mines Company, but in November of the same year the Nevada Hills Mining Company, Reorganized, of Reno, Nevada (H. G. Humphrey, President), took over the property and did considerable rehabilitation and development work under the direction of F. B. Hyder prior to the crash of 1929 (Min. and Sci. Press, vol. 127, no. 10, p. 413, 1929). The workings were deepened to 1300 feet during this period. In February 1932 the mine was reported sold to Fred Morris of San Francisco but the only work done on the mine prior to 1934 was by Grant Ewing. About 1035 tons of low grade ore was produced by leasers between 1934 and 1936. During the period 1952-53 Sam E. Wells and B. A. Miller drove a 450-foot exploratory tunnel on an old prospect southeast of the principal mine workings which is believed to have penetrated to a point only 80 feet from the vein. A compressor, 10-stamp mill and several mine buildings remain on the property (August 1954).

According to Logan (1935, p. 190) the total production of the Virginia mine between 1898 and 1931 was more than $660,000. Inasmuch as production under Coe (1979-1884) was about $100,000 and production since 1931 has been approximately $64,000 in gold and silver (U. S. Bureau of Mines records) it follows that the total production of the mine is at least $824,000 providing Logan's figures are correct. U. S. Bureau of Mines figures for the period 1898 to 1931 show a production of slightly less than half Logan's figure but some of the production may not have been reported.

The vein system at the Virginia mine is a segment of the east branch of the Mother Lode system which in this vicinity strikes N. 50-55° W. and dips 60° northeast, upon the average. Vein matter, which in places reaches a thickness of 150 feet (Fairbanks, 1890, p. 41), is predominantly ankerite-quartz mariposite rock, more or less banded and altered. The quartz sheets, in the vein near which the ore commonly is concentrated range from 8 inches to 4 feet wide. In addition to native gold, ore minerals include pyrite, chalcopyrite and galena. For the most part, the vein system follows the thrust-fault contact between serpentine, which forms the southwest or footwall side, and pyroxene andesite greenstone or mica schist on the northeast or hanging wall side. The serpentine is believed to be of Upper Jurassic age, the greenstone is either Jurassic or Paleozoic and the mica schist is part of the Paleozoic Calaveras group of metasediments. The principal ore shoot found northwest of the main shaft was mined down to 1200 feet and could not be located on the 1300-level. It varied in length from 180 to 300 feet above the 700-level, narrowed to 20 feet or less between the 700- and 1200-levels and apparently had a nearly vertical axis. Ore shoot width ranged from 8 inches to nearly 16 feet and averaged 3-4 feet. A second smaller and less persistent ore shoot was mined southeast of the main shaft.

Some bonanza ore was mined from the upper 80 feet of the vein, as previously mentioned. Much of the ore in the vicinity of the 400-level ran $15 per ton and $10 in the vicinity of the 300-level. On the 900-level much of the ore mined in 1922 averaged $15 per ton. In 1918 ore was reported to have averaged $17.50 per ton. In 1935, Logan stated that most of the production was from ore that ran more than $10 per ton. U. S. Bureau of Mines records indicate that the ore milled in 1904 averaged just under 0.74 oz. of gold per ton; in 1909 about 0.14 oz. of gold per ton; in 1914 approximately 0.45 oz. of gold per ton; and in the period 1919-1934, about 0.35 oz. of gold and 0.13 oz. of silver per ton. Several hundred pounds of copper was also recovered, as a by-product, in the early 1930s.

The principal working at the Virginia mine has been a 1300-foot inclined shaft, with levels at 100-foot intervals, and a connecting adit haulageway. The shaft is described as serving more than 10,000 feet of drifts (Laizure, 1928, p. 120). In addition to the shaft and adjoining workings there are three old adits south of but in the general vicinity of the main shaft, and a fourth crosscut adit (driven in 1952-53) 450 feet long which connects with an older working. The portal of last adit is 1700 feet southeast of the main haulageway adit portal, the mine buildings lying between these two localities. Most of the working could be entered in August, 1954 but undoubtedly are in need of rehabilitation.

Washington (Jenny Lind, Red Cloud) Mine. Location: Secs. 4, 5, T. 5 S., R. 16 E., M.D., a quarter of a mile north of the paved Hornitos-Bear Valley road and 2 miles northeast of Hornitos. Ownership: Pacific Mining Company, Crocker Building, 620 Market St., San Francisco 4, California, owns the patented Washington claim, containing 13.77 acres, and adjoining patented agricultural land aggregating 509 acres.

The Washington mine was discovered in 1850 and prior to 1900 was probably the most productive mine among the many in the Hornitos district. As early as 1851 it was equipped with a 6-stamp mill which, for a time, produced 1000 oz. of gold per day! Except for a short period between 1864 and 1868 operation was continuous from 1850 to about 1882. In 1859 a 20-stamp mill was built on the Merced River to serve the Washington mine. Much of the early work was done by the Washington Mining Company in which George Webber and Moses L. Rodgers were the principal partners. A 10-stamp mill was erected near the Washington shaft in 1867 by this management. The mine was reported to be 1400 feet deep in 1881 and to have been deepened to 1600 feet during that year (several entries in vols. 42 and 43 of the Mining and Scientific Press), but was found to be a little less than 1500 feet deep when reopened by the Lind Mining Company in 1941. Late in 1881 the property was reported purchased by Marcus and J. W. Hulings of Pennsylvania, along with the Quartz Mountain, Number Nine and numerous other mines in the Hornitos district. The Huling venture proved unsuccessful and the Washington mine reverted to M. L. Rodgers. Considerable development work was done by Rodgers in 1884 but the stock company under which Rodgers operated ceased to function in 1885. In 1896 it was announced that Rodgers had sold the mine to S. W. Parker and associates of New York, the Hornitos Gold Mining Company, and that further sale to an English company was being negotiated. Nothing came of this transaction and the property remained idle until reopened in 1903 by Harmon and Stevens (Jenny Lind Mining Company), together with the Quartz Mountain mine. Operations were directed by W. F. Stevens. This operation was also short lived with little or no production realized. Several further attempts were made to promote the mine, notably in 1900, 1910 and 1917. In 1922 the owner was still listed as the Washington Mining Company. The Cora Belle Mining Company took out a little high-grade ore in 1928 (U. S. Bureau of Mines records). The Mariposa-Washington Mining Company of Hornitos built a new mill in 1939 and milled about 4000 tons of dump material between 1939 and 1940. By 1941 the property had been acquired by the Lind Mining Company, a subsidiary of the Pacific Mining Company, which took out a large tonnage of ore of moderate grade between 1941 and 1942. The company reopened and

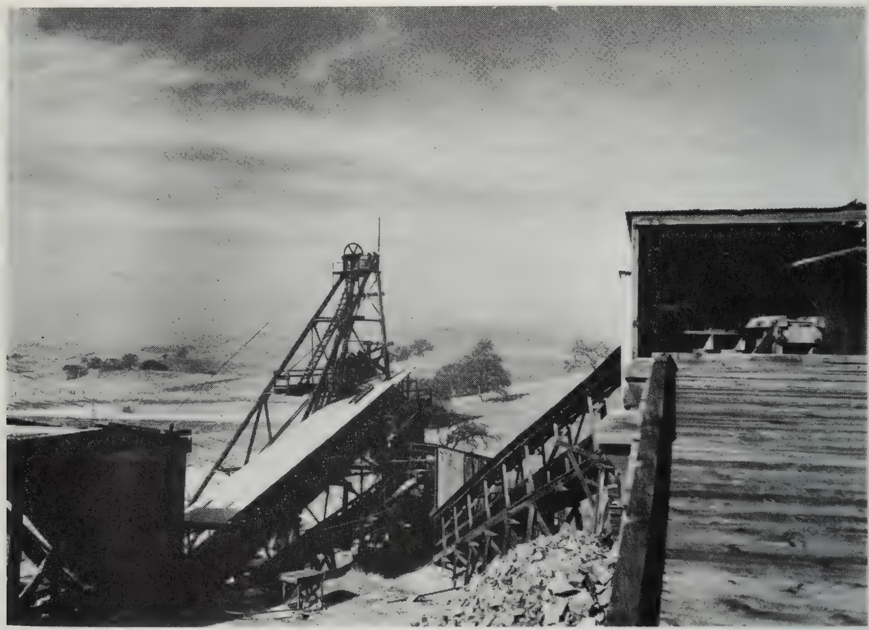

FIGURE 41. Installations at the Washington or Jenny Lind mine in the Hornitos district. The attractive rolling pasture land in the background is typical of the landscape in western Mariposa County. The Washington mine, with a production of $2,377,000, is second in productivity among the mines of the Hornitos district. *Photo by Mary H. Rice.*

unwatered the caved Jenny Lind shaft, re-equipped the mine and did extensive exploration and development work on the 700-, 800-, 1000-, 1100- and 1500-levels. The Jenny Lind shaft was deepened 36 feet to a point slightly below the 1500-level. The 1000-level was cleaned out to the Washington shaft which was found to be open between the 900- and 1000-levels. A total of 7923 feet of workings were cleaned out or newly driven between 1941 and 1942.

Between 1943 and 1945 the mill and flotation plant were leased by Red Cloud Mines Company, a subsidiary of Hecla Mining Company of Wallace, Idaho, to process complex zinc ore from the nearby Blue Moon mine. Both mine and mill have been idle since 1945, reopening awaiting more favorable economic conditions.

Prior to 1900 the Washington mine had an estimated production of $2,247,000 and a recorded production of $1,099,000 (Bowen and Crippen, 1948, p. 38). Between 1939 and 1942 a total of 17,356 tons of ore was milled which yielded 3131 oz. of gold, 2436 oz. of silver, 1060 lbs. of copper and 111 lbs. of lead for an average of about $6.35 per ton (U. S. Bureau of Mines records). The total estimated production to 1954 is $2,377,000. Bonanza ore was found in the upper parts of the vein but most of the recent production has been from ore running between $6.50 and $7 per ton. According to Raymond (1875, p. 50), ore averaged about $25 per ton, at a price of only $13 an ounce, in the middle 1870s.

The principal vein at the Washington mine strikes N. 40° W., dips 70-75° S.W. and averages 6 to 8 feet wide. Vein matter is chiefly ankerite-quartz-mariposite rock in which large sheets and lenses of milky to glassy quartz several feet thick are locally developed. The character of the vein closely resembles typical Mother Lode veins seen 7 miles farther east in Mariposa County. Ore minerals are chiefly pyrite and chalcopyrite with native gold. In addition to the quartz vein-ore there are, in places, masses of wall rock impregnated with auriferous pyrite (gray ore). This material commonly runs 0.09 oz. of gold per ton.

Wall rocks are mainly micaceous and amphibole-bearing schists and dark quartz-biotite hornfelses of Upper Jurassic age. According to Storms (1896, p. 224) the vein is accompanied by a light-colored felsitic dike which adjoins the vein on the footwall side in the southeast workings and on the hanging wall side in the northwest workings. Small, irregular intrusions of hornblendic granitic rock penetrate to the surface west of the present mine buildings. Much of the metamorphic rock seen in the vicinity of the shaft has been derived from platy, tuffaceous metasediments.

The most recently used working entrance to the Washington mine is the Jenny Lind shaft inclined at an angle of 68° and reaching a depth of 1500 feet. It is surmounted by a lofty steel headframe and the mill buildings are closely adjacent. The Jenny Lind shaft originally had levels of 500, 600, 700, 1000, 1100, 1200, 1300 and 1400 feet but the ground has been stoped and the levels largely destroyed between depths of 500 and 700 feet. Approximately 670 feet northwest of the Jenny Lind shaft is the Washington shaft 1000 feet deep and inclined at about the same angle as the Jenny Lind. This is open from the surface to a depth of 1500 feet and is known to be open between 900- and 1000-levels. Workings connecting with the Washington and Jenny Lind shafts total nearly 2 miles.

About 200 feet north of the Washington shaft is the Franklin shaft, 200 feet deep, and 500 feet still farther north is a fourth old shaft 100-150 feet deep. There is a line of shallow workings between the two old northwesterly shafts.

There is (August 1954) crushing, hoisting and milling equipment on the property and there are several good mine buildings. A graded dirt road connects with the paved Hornitos-Bear Valley road.

White Porphyry Group. Location: Sec. 34, T. 3 S., R. 17 E., M.D., in the Cat Town district 3 miles southeast of Buckhorn Peak or 7½ airline miles southeast of Coulterville. Accessible from Highway 49 by way of the unimproved Buckhorn Peak-Solomon Gulch-Black Bart road via the Schilling Ranch and Rybergs. Ownership: several of the most northerly workings were being operated in September 1955 by F. E. Ryberg, Coulterville. Ownership of the other claims could not be determined.

The mile-long line of open stopes of the White-Porphyry group is a conspicuous landmark southeast of Schilling Ranch and Buckhorn Peak. It diagonally crosses section 34 on a gullied plateau. So far as the authors were able to discover, nothing has ever been written about these workings—extensive as they are. They undoubtedly date back to the 1870s or before in the heyday of the Black Bart group mines lying half a mile to the northeast.

Workings are arranged in two parallel lines along either wall of a white albitite dike 30 to 50 feet thick traceable at the surface for over

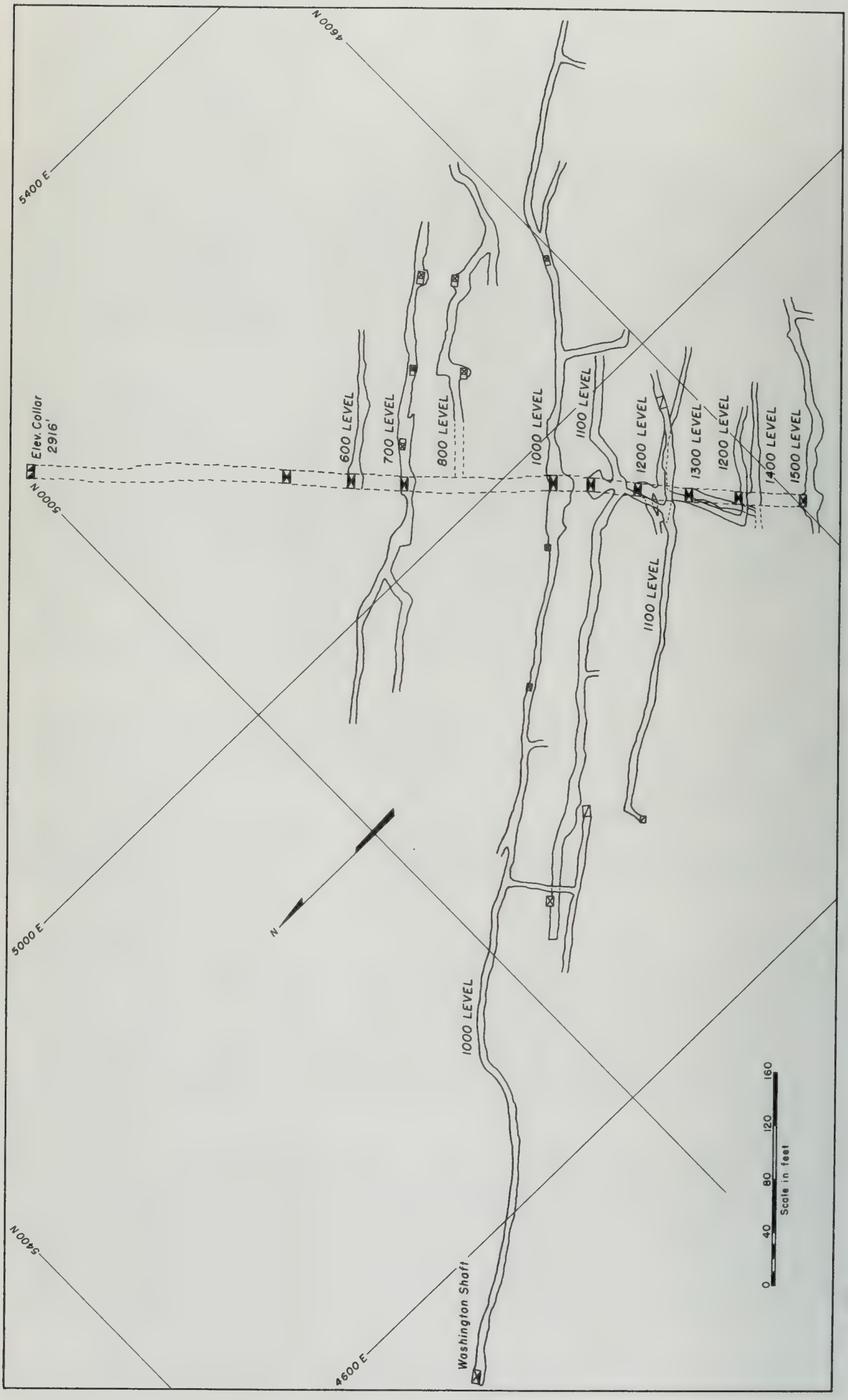
5400 E
4600 N
Elev. Collar
2916'
600 LEVEL
700 LEVEL
800 LEVEL
1000 LEVEL
1100 LEVEL
1200 LEVEL
1300 LEVEL
1200 LEVEL
1400 LEVEL
1500 LEVEL
1100 LEVEL
5000 N
N
5000 E
1000 LEVEL
5400 N
Washington Shaft
4600 E
0
40
80
120
160
Scale in feet

FIGURE 42. Sectional drawing through the workings of the Washington mine.
Reproduced through courtesy of the Pacific Mining Company.

a mile. This dike strikes N. 40-45° W. and dips 75° northeast. Wall rocks are slate, schist and metachert of the Paleozoic Calaveras group. Gold tends to occur in rust colored pockets in the albitite adjacent to quartz stringers and to the enclosing slaty wall rocks, or in the quartz stringers which cut both the albitite and the wall rocks close to the contact. Ore apparently was confined to a narrow contact zone nowhere over 6 or 7 feet wide and commonly only 3 feet wide. The average depth of the open stopes is now only 30 to 40 feet but some caved workings probably extended down over 100 feet. Horses of schist, slate and metachert locally are caught in the albitite and some appear to have been faborable places for concentration of ore.

No data are available on the production from this group of workings but from the length and persistence of the stopes and the known high grade of ore pockets in this district the yield must have been large. The relative shallowness of the workings indicates that the best ore was in the oxidized zone and may have been of considerably lower grade at depth.

Whitlock Group (Consolidated Whitlock and Alabama). Location: Sec. 32, T. 4 S., R. 18 E., M.D., east of the Whitlock Creek road 3½ airline miles northwest of Mariposa and 4½ miles by graded dirt road from Mt. Bullion on Highway 49. Ownership: Dr. Frank E. Gallison, P. O. Box 491, Ventura, California, and E. J. Freethy, 1432 Kearney St., El Cerrito, California, own 3 patented claims, the Westward, Alabama and Whitlock, aggregating 47.68 acres.

The Whitlock group of mines was discovered prior to 1870, probably in the 1850's or 1860's as an aftermath of placer-mining on Whitlock Creek. In 1871 the property was transferred under option for $20,000, to Stephens and Lamber (Min. and Sci. Press, vol. 22, no. 9, 1871). Some production was made by this partnership that year and there was intermittent activity at the mine by others, probably leasers, through the 1870s. After a period of inactivity of several years' duration in the early 1880s, the property was reopened or at least re-explored by Captain Diltz of the Diltz mine. At that time the ore was reported to average about $20 per ton and the vein to be 5 feet thick (Min. and Sci. Press, vol. 46, no. 21, p. 256, 1883). During the early 1890s the mine was owned and operated by the Ward Brothers. About 1895 the mine was sold by Wards to the Sierra Buttes Gold Mining Company of London, England, and most of the development work and sustained mining at the property was done in the ensuing 5 years (Storms, 1896, p. 24; Min. and Sci. Press, several issues 1892-1895). The Sierra Buttes company erected a 20-stamp mill, replacing an earlier, smaller mill, and maintained a steady production from 1895 to 1900. About $482,000 was recovered during this period. Mining ceased with ''considerable ore still in sight'' because of the high operating costs (Castello, 1921, p. 142). Jacob Teets was listed as the owner in 1904 (Williamson, p. 13) but by 1914 the property had passed into the Gallison family and Lizzie Sain. A small production by Gallison and Sain was recorded between 1940 and 1942 when 942 tons of ore milled yielded only 133 oz. of gold and 33 oz. of silver. Little or no work has been done on the property since 1942. The total production of the mine is estimated to be about $500,000.

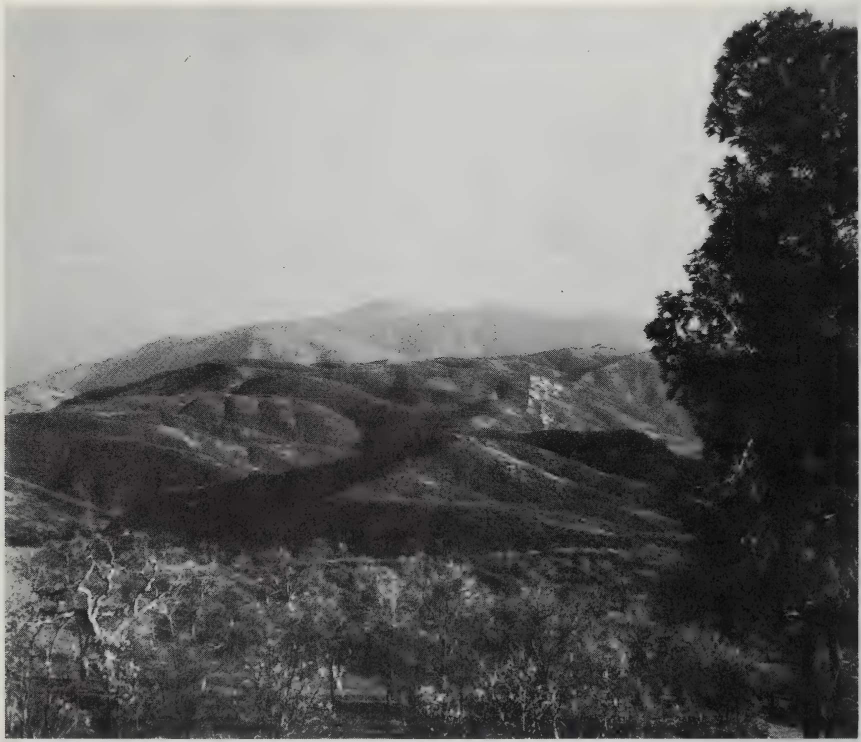

FIGURE 43. Panorama across the rugged country in the Cat Town district, south of Buckhorn Peak and east of Highway 49, observer facing slightly east of south. Slightly to the right of the center of the photo 2 parallel lines of dumps and open stopes may be seen which are on the White Porphyry group of claims. Gold occurs there in pockets along either wall of a 40-foot-wide albitite dike. The pockets are in places found in quartz stringers cutting the albitite or the adjacent wall rocks or else are in rusty spots in the albitite dike itself. *Photo by Mary H. Rice.*

There are three veins on the Whitlock group of claims, the Whitlock, Alabama and Westward. The Whitlock vein strikes north to N. 10° E., dips 75° east to nearly vertical, and ranges from 4 to 10 feet wide. Vein matter is chiefly milky quartz. Ore minerals are chiefly pyrite and minor chalcopyrite with native gold, but locally argentiferous galena is prominent—particularly in the ore mined in 1900. From the stopes described in old accounts there apparently were two main oreshoots, one about 150 feet long and one about 240 feet long. Wall rocks are massive pyroxene andesite greenstone of unknown age. The Alabama and Westward veins are roughly parallel with the Whitlock vein but diverge slightly toward it to the north. They are less well defined and apparently contained less ore than the Whitlock vein. In any event the Westward vein was very superficially developed and workings on the Alabama vein are much less extensive than those on the Whitlock vein.

Principal workings on the Whitlock vein are a 900-foot, steeply inclined shaft, with 4 levels, and a 600-foot crosscut adit with connecting drifts. Drifts connecting with the main shaft aggregate about 3000 feet (Castello, 1921, p. 142) and those connecting with the crosscut total several hundred feet. There are several other crosscut adits of unknown length. None of the workings have been recently used and must be cleaned out (August, 1954). The Alabama vein has been developed by an inclined shaft and connecting drifts of unknown extent. These workings are also inaccessible.

Williams Brothers (Gibbs) Mine. Location: Secs. 31, 32, T. 3 S., R. 20 E., M.D., on the southeast slope of Brown Peak 400 feet below the divide at Canty Meadow. It is 3 miles south and 1 mile west of El Portal and is accessible by about 9 miles of steep mountain road via Cold Canyon.

Ownership: Earl, Ray, Fred and G. H. Williams and Ralph Zelers, address El Portal, California or Rt. 1, Box 1061 E., Modesto, California, hold four unpatented claims the Williams Brothers and the 2, 4 and 5 extensions, totaling about 80 acres.

The Williams Brothers mine, known in the early days as the Gibbs mine, was probably first worked in the 1860s about the time of discovery of the nearby Hite mine and the adjacent Mexican or El Carmen mine. It was developed by 3 drift adits which are now being rehabilitated. Driving of these workings was done partly in 1875 (Min. and Sci. Press, vol. 30, p. 364). Because of its relative inaccessibility little or no work had been done for several decades until the present owners acquired the property in the late 1940s. In 1949 a 5-ton Gibson mill was packed to the mine by horseback for mill testing and some high-grade ore found on the dump was processed at this time. In 1950 a 9-mile road into the property from Highway 140 was started by the Williams partnership. Pacific Placers Engineers Company entered into a joint contract with the Williams group for construction of the road to the Williams Brothers and Kaderitas mines. The road was completed to the Williams Brothers mine in December 1952. A 5-stamp mill was completed in 1953 and for some time ran on ore taken from old dumps. The dump material yielded about $10 per ton. In 1954 work was started on the lowermost of three old adits. Some ore mined that year ran $27.22 per ton in gold. Development was still progressing in September, 1955.

The principal vein on the property strikes about N. 40° W. and dips northeast at angles varying from 25° to nearly vertical. Vein matter is chiefly milky to glassy quartz containing wall-rock fragments. Vein matter is 6 to 20 feet thick averaging perhaps 6 or 8 feet. Gold occurs in small shoots and pockets in the quartz commonly associated with fractured, friable pyrite. Flecks of other sulfides such as sphalerite, galena and arsenopyrite may be seen in some of the ore but are not common. The vein matter characteristically is full of vugs or small cavities lined with masses of spongy to friable pyrite. The trend of the ore shoots had not been determined at the time of the author's visit to the mine in September, 1954.

Workings consist of 3 adits 150, 75 and 200 feet long, respectively, upper to lower. These were in process of being cleaned out in September, 1954 and some raising and stoping was being done above the lower adit level. There apparently had been considerable stoping from the upper levels in early days.

The 5-stamp mill has a capacity of 1 ton per hour. Ore is crushed in an 8-inch jaw crusher and the 5 stamps to pass a 45-mesh screen. It is

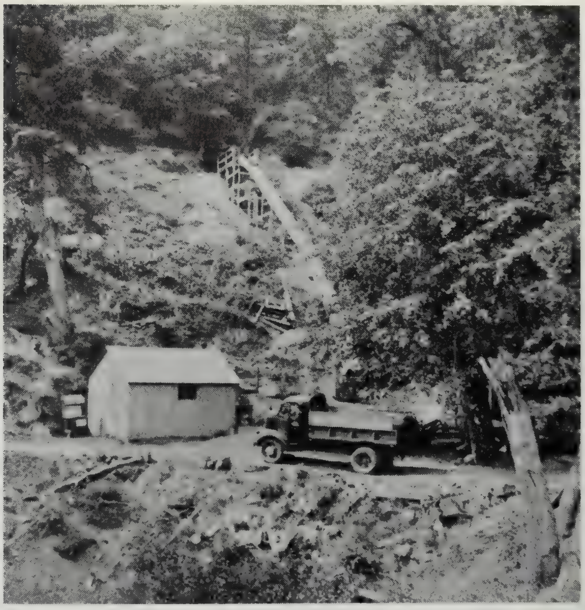

FIGURE 44. Main adit at the Williams Brothers mine on the northeast slope of Browns Peak in the Hite Cove-El Portal district. Ore is dropped down the incline to road level and trucked to the mill.

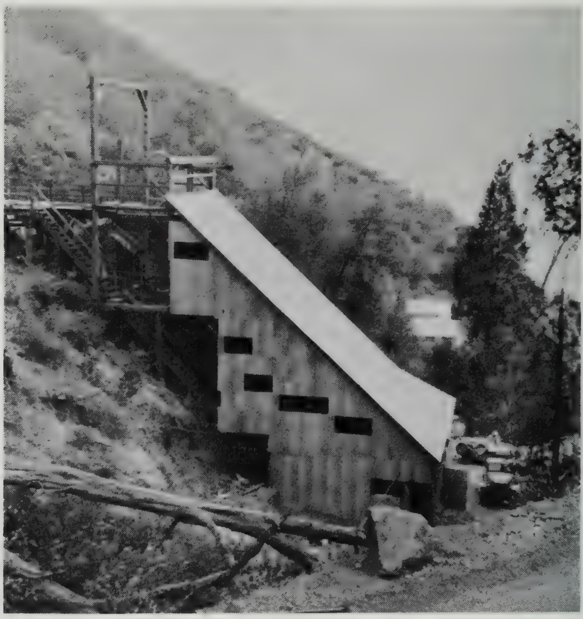

FIGURE 45. Mill buildings at the Williams Brothers mine. Known in the early days as the Gibbs mine, this old working was reactivated in 1949 and had operated most of the time up to 1956, producing small tonnages of good-grade ore during development work.

then passed over amalgamating plates and a concentrating table. Sulfide concentrates will be saved for future smelter shipment.

Yellowstone (Yellowstone-Sirocco, Sirocco) Mine. Location: Sec. 19, T. 4 S., R. 17 E., M.D., just north of the paved Bear Valley-Hornitos road 1½ miles west of Bear Valley. Ownership: Not determined. Last operator was Glenn Coburn of Mariposa (1941).

The Yellowstone mine was discovered sometime prior to 1893. During that year it was operated by Burt and Bach of Bear Valley (Storms, 1894, p. 175) under the name Sirocco mine and had extensive underground workings and steam hoisting equipment. In 1896 the operators were listed as the Yellowstone Mining Company of San Francisco, C. H. Burt of Bear Valley acting as superintendent (Storms, 1896, p. 224). The mine was then called the Yellowstone-Sirocco mine. About 1897 the property was taken over under bond by a Chicago group with G. Seymour acting as superintendent (Min. and Sci. Press, vol. 74, no. 8, p. 154, 1897). At that time the main shaft was 420 feet deep and a second shaft at the west end of the property was down 70 feet. Good ore was reported to be coming from both shafts (Eng. and Min. Jour., vol. 63, no. 10, 240, 1897). About $22,000 in gold was recovered between 1896 and 1897 (U.S. Bureau of Mines records). The mine apparently lay idle until about 1935 but about 650 tons of low-grade ore was produced between 1935 and 1941, most of this by Glenn Coburn of Mariposa (U. S. Bureau of Mines records). There has been no recent activity at the property except for utilization of the extensive dumps for road base and fill.

The Yellowstone mine workings are chiefly on a narrow shear zone striking N. 40-45° E. and dipping 75° northwest. Quartz occurs in pods and larger lenticular masses in sheared greenstone (pyroxene andesite). Storms (1896, p. 224) describe calcitic masses in the vein but none of these were observed at the surface. Gold occurs in quartz and in adjacent schistose wall rock, according to Storms (1896, p. 175). No ore minerals were found on the dump by the authors.

Workings originally consisted of a 420-foot and a 70-foot inclined shaft and at least 2 crosscut adits. One of these trended about N. 45° W. and the other nearly due north. None of the workings are accessible owing to caving. Judging from the size of the dumps the underground workings must be extensive. Ore apparently was very pockety.

Placer Mines

Placer deposits in Mariposa County were worked as early as 1848, and possibly earlier, by Californians of Spanish descent. These operations apparently began on Agua Fria Creek, rapidly spread to the Hornitos district and before 1870 had spread to almost every creek and gulch west of a cross-county line joining Wawona and El Portal. There are few if any gold-quartz veins east of this line. During the first two decades mining was carried on almost exclusively by hand methods. In the late 1860s and during the 1870s some hydraulicking and ground sluicing were done, notably along the Merced River west of Bagby and at the Schroeder placer ground west of Sherlock Creek. Very little drift mining for buried placers has been done in Mariposa County as such deposits are rare. Some drift mining was carried on

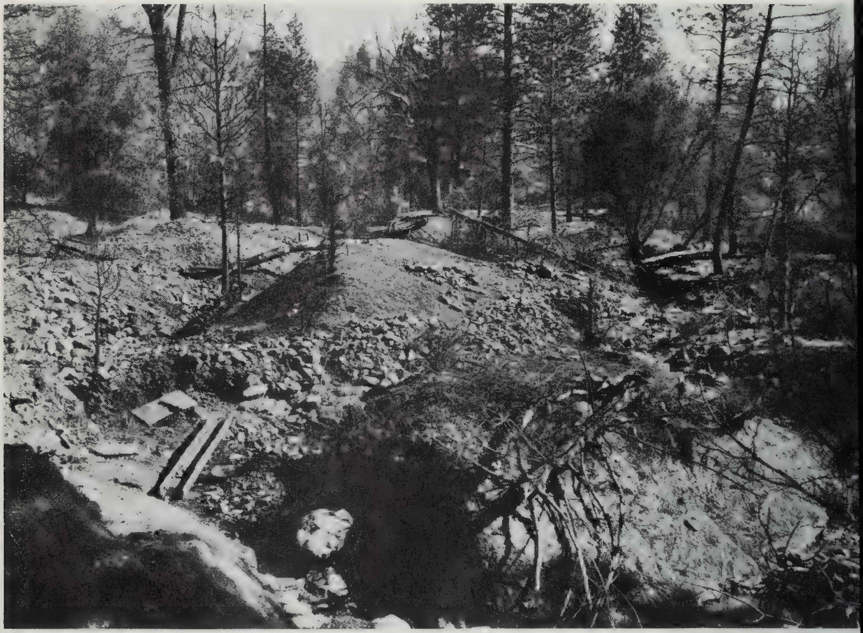

FIGURE 46. A typical scene on the Weston placer ground on Sherlock Creek half a mile southeast of the Diltz gold mine. In places the productive part of the old Pleistocene (?) channel gravels were followed underground in tunnels. In others the entire pile of gravel was washed for gold. *Photo by Mary H. Rice.*

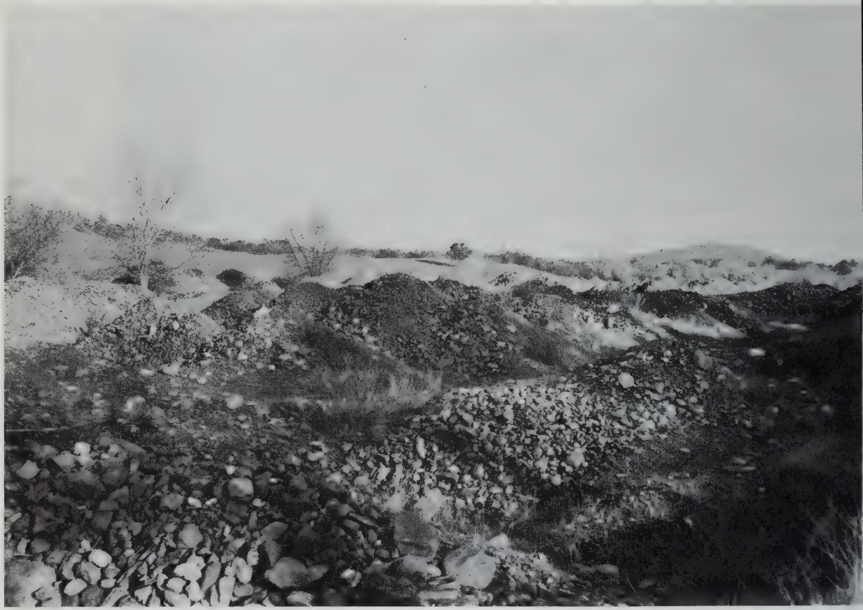

FIGURE 47. Dragline dredge tailings along Burns Creek south of Hornitos. As gravels may be handled very cheaply by this method of mining the gravels in this vicinity, which ranged from 12 to 20 cents per cubic yard in gold, could be profitably handled during the depression years of the 1930's. *Photo by Mary H. Rice.*

at the Weston bench-gravel ground southeast of the Diltz mine on Sherlock Creek and at the Schroeder property previously mentioned.

Only 3 patches of Tertiary gravels have been found in the county, one about 4 miles northwest of Forty Nine Gap in the Blanchard district of northwestern Mariposa County, a second (the largest) on the county line south of Jawbone Ridge, Tuolumne County, and the third high on the ridge lying between Moore and Jordan Creeks 4 to 5 miles northwest of Bower Cave. These produced considerable gold in early days but have long since been worked out.

Bench gravels of Quaternary, possibly Pleistocene age, have been worked on the old Weston property east of Sherlock Creek and southeast of the Diltz mine and there probably were others of this type in the county. Unfortunately, these deposits have been so thoroughly disturbed that their original character and distribution cannot be easily ascertained.

Much of the placering, hydraulicking and ground sluicing done in the county has been on the weathered, uppermost parts of the quartz veins themselves or the soil mantle covering them. Deposits of this sort commonly were very rich in coarse gold and more than a few important underground mines were financed by the easily recovered gold found near the vein outcrop. Notable amounts of gold were recovered from such material at the Diltz, Schroeder, and Mt. Gaines mines and at many of the mines in the Colorado district such as the Landrum, Artru and Champion.

All of the other placer deposits in the county are Quaternary streambed deposits or shallow bench gravels lying only a few feet above the present high water levels of the contemporary streams. Although there is a steady dribble of placer gold coming from small patches of ground overlooked in the early days or from material reconcentrated during times of high water by present streams, most of the production during the last 2 decades has been from dredges processing material too low in grade to have attracted the early-day placer miner. These only became profitable to work when heavy equipment was designed to handle huge yardages at very low cost. Dredges operated within the past 25 years have, for the most part, processed ground that yielded from 13 to 25 cents per cubic yard. A little ground was worked that ran as low as 7 cents per cubic yard. Most of the recent dredging has been done along Mariposa, Burns, Eldorado, Cotton and Temperance Creeks.

Julihn and Horton (1940, p. 159) have estimated that the total placer gold production up to 1870 probably did not exceed $10,000,000. If this figure is accepted then the total production of placer gold in Mariposa County to 1955 is about $12,000,000.

Inasmuch as most of the placer ground has been pretty well worked out and as a majority of the properties are no longer classed as mines, none are discussed here in detail. Operations within the past 25 years have been described by Julihn and Horton (1940, pp. 158-162) and Averill (1946, pp. 261-262). Some data on most of the placer mines will be found in the accompanying tabulated list.

Lead

Lead has been produced in substantial quantities in Mariposa County from complex zinc ore and as a by-product in the milling of gold ore.

The total recorded production of lead up to 1954 has been about 709,508 pounds. The principal producer has been the Blue Moon zinc mine with a production of 533,753 pounds. Gold mines which have yielded by-product lead in substantial amounts are the Bondurant (85,000 pounds), Malvina group (about 25,000 pounds), Pine Tree and Josephine, Mount Gaines and Washington or Jenny Lind. The complex zinc ores have been worked almost entirely in wartime. Production of by-product lead follows fairly closely the production of gold.

The principal primary lead ore-mineral in both the zinc and gold ores is galena, although minor amounts of lead carbonate and sulfate probably are present in oxidized parts of the veins. The complex ores of the Blue Moon mine are confined to shear zones in hydrothermally altered greenstone, where they form banded deposits parallel to the schistosity. The greenstone is commonly converted to sericite schist adjacent to the ore bodies. Some galena is generally present in all types of gold-bearing veins.

The various lead-producing mines, which number about 20, are discussed elsewhere under the headings zinc and gold. With the exception of those listed above, these have produced less that 3000 pounds of lead each.

Manganese

Manganese has been mined in a small way in Mariposa County during wartime periods of high price and government subsidy. Only a few hundreds of tons of ore have been marketed. Most of the known occurrences fall in two districts, the Granite Springs-Jasper Point district 5 airline miles southwest of Coulterville, and the Sweetwater district 2 miles northwest of Jerseydale and 10 miles northeast of Mariposa.

Manganese occurs in sedimentary deposits associated with chert or metamorphosed sedimentary deposits, chiefly quartzite derived from chert. Volcanic rocks are commonly associated with the cherts, and the manganese is generally believed to have originated in mineral water introduced onto the sea floor by volcanic activity. None of the deposits are in the form of hydrothermally deposited veins. The manganiferous cherts southwest of Coulterville are found in a northwest-trending belt in the Hunter Valley Chert formation of the Upper Jurassic Amador group (Taliaferro, 1943, p. 283). Associated with the chert, which occurs in lenticular masses up to several hundred feet thick and 4 miles long, are tuffaceous sediments and submarine lava flows. Manganiferous parts of the chert masses generally are only a few feet wide and less than a hundred feet long, although a manganiferous zone over 750 feet long has been found at the Caldwell mine. In the Sweetwater district manganese ore occurs in small lenticular and irregular masses within quartzite. The quartzite is a laminated rock derived from chert and is associated with schist and phyllite derived from shale. These rocks belong to the Paleozoic Calaveras group and occur in the Jerseydale district principally as pendants in granitic rocks.

Most of the manganese occurrences have been explored very superficially and no large reserves have been proved thus far. All of the known deposits in California were studied in considerable detail by Federal agencies during the wartime periods of World Wars I and II. The results of these studies have been published as Bulletins 125 and

152 of the State Division of Mines. The following mine description and the tabulated list data have been abstracted from pages 106-112 of Bulletin 152 written by Ivan F. Wilson and N. L. Taliaferro. The deposits have been inactive for more than 10 years and were not visited by the authors during this investigation.

Caldwell (Daly) Mine. Location: NE¼ sec. 14, T. 4 S., R. 15 E., M. D., on the Caldwell Ranch 1.5 miles south of Granite Springs School and 7 miles west of Coulterville via State Highway 132. Ownership: The mine is on patented agricultural land, ownership of which was not determined.

The Caldwell mine is the most extensively developed manganese property in the county and the only one having recorded production. First worked during World War I as the Daly mine, it produced between 100 and 200 tons of ore. About 1937 the mine was reactivated and produced some ore between 1937 and 1943. The total production has been about 265 tons of ore averaging nearly 45 percent manganese.

The principal (north) group of workings lies along a single bed or connected series of lenses 2 to 5 feet thick enclosed in chert of the Upper Jurassic Hunter Valley formation. The ore is associated with thick-bedded red chert, thin-bedded buff-to-gray chert and thick-bedded white chert. These cherts are enclosed in gray and green metatuff and andesite greenstone. The manganiferous zone is traceable for more than 1000 feet in the northern group of workings. Ore minerals are chiefly black psilomelane and pyrolusite but there is considerable carbonate ore consisting of brown, gray and pink manganocalcite. Manganocalcite ore runs 20-30 percent manganese, which in past years has been too low grade to mine. Over much of its length the ore zone strikes N. 5° E. and dips 50-80° east, but is markedly sinuous over part of its length and the dips locally change to steeply west.

There is an inclined shaft 57 feet deep along a 45° incline with a 26-foot drift at the bottom. A second shaft 10 feet deep is 500 feet south of the main shaft and a third shaft 15 feet deep lies 800 feet south of the main shaft. There are also about 30 open cuts scattered along the ore-zone for a distance of more than 1000 feet.

A quarter of a mile south of the principal or northern group of workings and apparently on the same chert belt is a second group of shallow workings covering a distance of 170 feet. There the chert is thin-bedded and has thin interlaminations of shale. These beds strike N. 45° W. and dip 55° N.E. A few inches to 2 feet of soft, shaly, black oxide ore is exposed at the southern end of the ore-zone and the dump contained about 13 tons of ore in 1942.

The 1918 production of the mine (about 100 tons) averaged 45 percent manganese, 6 percent iron and 13 percent silica. Nine tons of ore shipped in 1942 ran 49.3 percent manganese, 4.1 percent aluminum, 2.1 percent iron, 0.038 percent phosphorus and 11.3 percent silica. Ore running at least 20 percent manganese remained in the mine in 1942.

Nickel

Nickel occurs in Mariposa County in minor amounts in Mother Lode gold-quartz veins, notably at the Pine Tree and Josephine mine just south of Bagby. It is found in the primary minerals niccolite (nickel arsenide) and millerite (nickel sulfide) associated with pyrite, arsenopyrite, chalcopyrite, sphalerite, galena and native gold. The nickel content of the sulfide concentrates from the Pine Tree and Josephine mine ranged from 0.35 to 1.35 percent; during 1936 the concentrates averaged 0.77 percent (Julihn and Horton, 1940, p. 110). No attempt has been made thus far to recover the nickel.

Nickel is also found in trace amounts (0.2-0.8%) in almost all of the serpentines of the foothill gold belt and may possibly be found within the county concentrated in small garnierite-rich lateritic deposits on ancient, deeply weathered surfaces worn on serpentine.

Platinum

Finds of platinum have been reported in Mariposa County from time to time; the Platinum King group in sec. 31, T. 3 S., R. 17 E., and the Clark or Devils Gulch claims in secs. 1 and 12, T. 4 S., R. 19 E., M.D., have allegedly contained the greatest amount. No platinum has been marketed from any of these vein deposits and its presence has never been authenticated. On the Devils Gulch claim platinum was reported to occur in 2 zones each a few inches wide on both sides of barren quartz vein matter associated with gold and with minor cobalt, nickel and tin. Such an association is improbable and it is possible that the metals were misidentified.

Platinum-group metals occur in minor amounts in placer gold deposits of the county but so far the authors have been able to determine only an ounce or two has been recovered—from dredge ground in the Hornitos district.

Quicksilver

Cinnabar in small quantities has been found in the Crystal mine on the southwest slope of Horseshoe Bend Mountain in secs. 15, 16, T. 3 S., R. 16 E., M.D. Two specimens of high-grade ore from this locality are on display in the Division of Mines museum in the Ferry Building, San Francisco. The vertical Crystal vein worked principally for gold, strikes N. 60° E., intersecting the Cabinet and Lookout veins at right angles. Cinnabar occurs as drusy crystal groups and blebs in calcite vein-matter and in hydrothermally altered greenstone close to the vein. The quantity of ore uncovered apparently was very small and no quicksilver was ever recovered from the cinnabar ore.

Silver

Mesothermal quartz veins carrying native gold and silver and the silver sulfo-salts proustite and pyrargyrite are found in the Bootjack district of southern Mariposa County, notably at the Silver Bar and Silver Lane mines. This type of occurrence is unique among the mines of the county, most of the silver having been recovered from ores containing gold-silver alloys or from argentiferous galena in gold mines. The total silver recovered from this type of deposit has been small, however, and the very substantial silver production of Mariposa County, amounting to about $345,000, has come principally from mines worked primarily for gold.

Silver Bar (Bryan, Silver) Mine. Location: Secs. 8, 9, T. 6 S., R. 19 E., M.D., on the Wallman ranch 3 miles south and 1 mile west of Bootjack and 3½ airline miles southeast of Mormon Bar. Accessible by

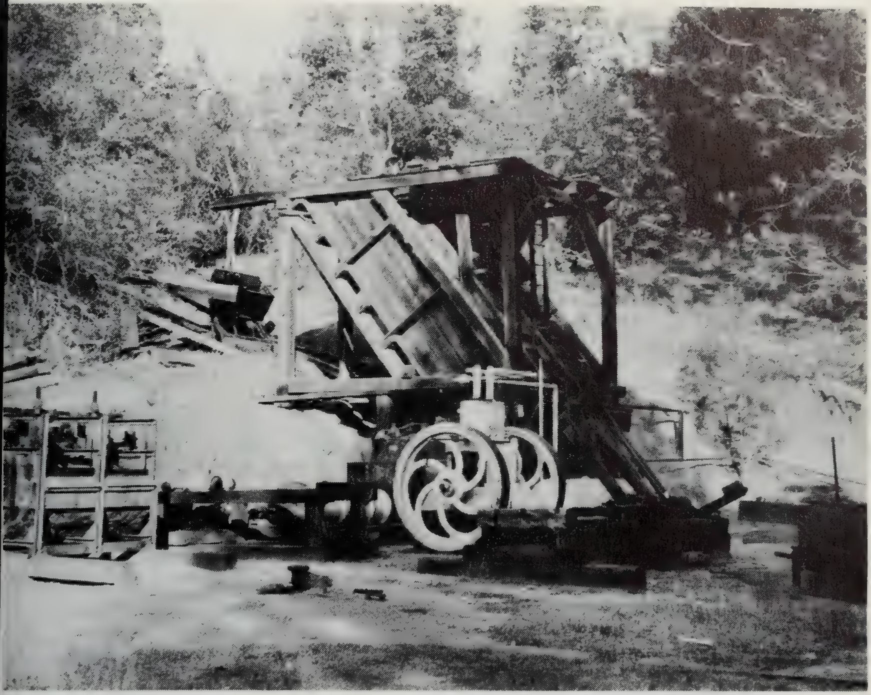

FIGURE 48. Headframe and idle mining equipment at the Silver Bar silver mine in the Bootjack district 3 airline miles southeast of Mormon Bar. The Silver Bar mine is one of a small group of quartz vein mines in the Bootjack district where the principal ore mineral is pyrargyrite.

3½ miles of dirt road from the graded Mormon Bar-Moore Hill road. Ownership: Jeffery Investment Co., 7041 Thornhill Dr., Oakland 11, California, holds four claims.

The Silver Bar mine known also as the Bryan or Silver mine, was worked in a small way prior to 1927. A small production was recorded for the years 1909, 1920 and 1921. During 1927 the property was operated under lease by A. D. Lane, et al., of Mariposa. This management did considerable development work and built a small mill, and a small production was realized in 1930. During the late 1930's the mine was operated by Richard E. Jeffery of Mariposa. Most of the silver production was made in 1930. In other years gold has been the principal metal recovered, from the point of view of value.

The Silver Bar vein strikes N. 60-65° W., dips 45° southwest and ranges from a few inches up to 5 feet wide. Near the surface the width seldom exceeds 1 foot. Ore exposed on the dump showed galena, pyrite, arsenopyrite and argentite. Proustite, pyrargyrite, native silver and gold are also reported in the ore from the mine (Julihn and Horton, 1940, p. 163). Wall rocks are hornblende biotite granodiorite or quartz diorite of Upper Jurassic or early Cretaceous age. In 1939 ore was said to average 15 to 20 oz. of silver and 0.15 oz. of gold per ton (Julihn and Horton, 1940, p. 163). The tonnage of ore mined or blocked out at that time was about 4000 tons.

Workings (September, 1954) consist of a 257-foot shaft, inclined 45° southwest, surmounted by an ore bin and crusher housing, and a partly caved drift adit striking N. 65-70° W. The headframe of the shaft has been demolished and the shaft is partly caved and inaccessible. The tunnel is in need of cleaning out but can be entered. The shaft serves levels at 100 and 200 feet, the 100-level having a 235-foot east drift and an 85-foot west drift, and the 200-level having a 263-foot east drift and a 245-foot west drift.

Milling equipment includes a 5-foot Huntington mill, small tube mill, two small ball mills, a Union compressor, and two Kraut flotation cells. One small cabin is the only building on the property. The mine makes about 750 gallons of water a day and water shortage has limited past operations.

Silver Lane (Goldenrod, Wallman Ranch) Mine. Location: Secs. 8, 9, 16, 17, T. 6 S., R. 19 E., M.D., 4 airline miles south and 1 mile west of Bootjack and half a mile south of the Silver Bar mine. Accessible by 3½ miles of dirt road from the graded Mormon Bar-Moore Hill road. Ownership: Not determined.

The early history of the Silver Lane mine has not been recorded although much of the area has been ground-sluiced and presumably started as a placer area. The principal period of operation was 1933 to 1938 by the Silver Lane Gold Mining Company, A. D. Lane, et al.,

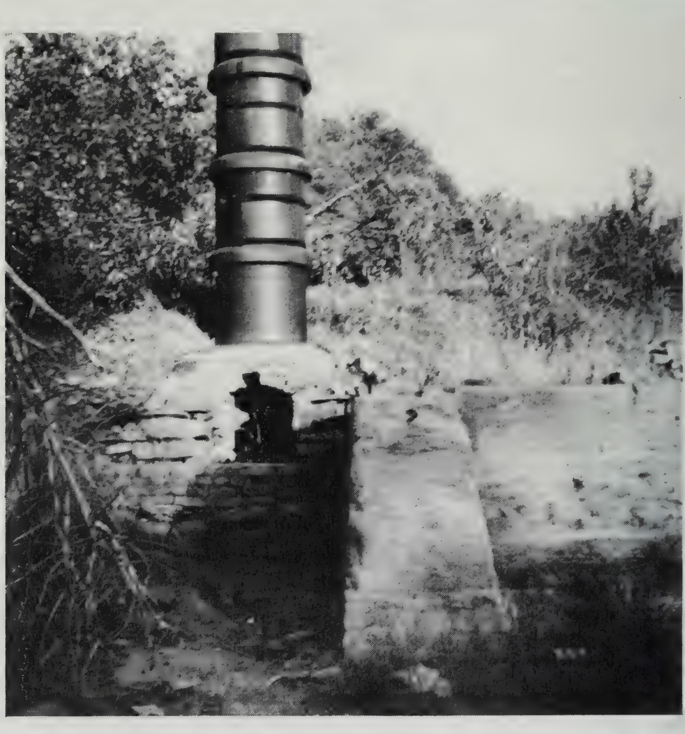

FIGURE 49. Part of an old smelter at the Silver Lane silver mine in the Bootjack district southeast of Mormon Bar. Sulpho-salts of silver, mainly pyrargyrite, were roasted in wood- or charcoal-fired furnaces to free the silver in the ore.

hen of Ben Hur, California. Equipment constructed to employ com-ined roasting and chlorination, included a 50-ton crusher, rod mill, oasting furnace and leaching tank (Laizure, 1935, pp. 44-45). The oist and compressor were steam-powered as steam was to be utilized in he extraction process. Ore reserves believed to contain $60,000 were eveloped but only a small part of the ore was ever processed. The op-ration was greatly hampered by insufficient water. All equipment in-luding the headframe, ore bin and buildings has been removed and the roperty was idle in September, 1954.

At the surface a quartz vein 8 inches to 14 inches wide strikes N. 0° W. and dips 35-45° southwest. The vein is reported to average feet wide at depth (Laizure, 1935, p. 44) and to contain the ore inerals argentite, proustite, pyrargyrite, cerargyrite, native silver, yrite, galena and a little gold (Julihn and Horton, 1940, p. 164). re remaining on the dump in 1954 contained pyrite, chalcopyrite, yrargyrite, galena and argentite (?). Gangue material is chiefly milky nd glassy quartz with vugs and crude comb structures. Wall rocks re hornblende biotite granodiorite or quartz diorite. Several tons of re shipped to Selby smelter in 1938 yielded $38.50 in silver and $5.50 n gold (Julihn and Horton, 1940, p. 164).

Workings consist of a 240-foot inclined shaft with 2 levels and a econd shaft of unknown extent. There is a 90-foot east drift on the 00-level and a 72-foot east and 21-foot west drift on the 200-level. oth shafts were caved and inaccessible in September 1954.

ungsten

Tungsten occurs in Mariposa County in mesothermal gold-bearing eins and as replacement disseminations in metamorphic rocks adjacent o granitic intrusive contacts. In both of these types of occurrences the rincipal ore mineral is scheelite, calcium tungstate. Wolframite (iron-manganese tungstate) has been found in small amounts in quartz near the Buchanan mine 6 miles southwest of Raymond, Madera County, nd might be expected in adjacent southwestern Mariposa County, also. Contact metamorphic rocks (tactites and skarn rocks) containing scheelite most readily develop at the borders of limestone and dolomite pendants but are also found in aluminous rocks such as mica schists and spotted slates. At the Big Grizzly group of claims in Ned Gulch 1½ miles northwest of Clearinghouse scheelite occurs in gold-bearing quartz veins (Tucker and Sampson, 1941, p. 580). Scheelite also is known to occur disseminated in quartz veins at the Early mine in the Sweetwater district 2 airline miles northwest of Jerseydale.

Most of the recent activity in tungsten has centered around El Portal where the Incline Mining Company of San Francisco has been developing several groups of tungsten claims. A new tungsten-ore-processing mill was built by the company and placed in operation by John P. Jones. It is close to the north bank of the Merced River half a mile by road west of the El Portal barite-processing plant on Rancheria Flat. Storms, which washed out roads to the tungsten mines, caused a temporary shutdown of the mill in February, 1956. Future activity in tungsten in Mariposa County will depend largely upon the continuation of the government stockpiling program and upon the tungsten price supports as there are no known high-grade deposits.

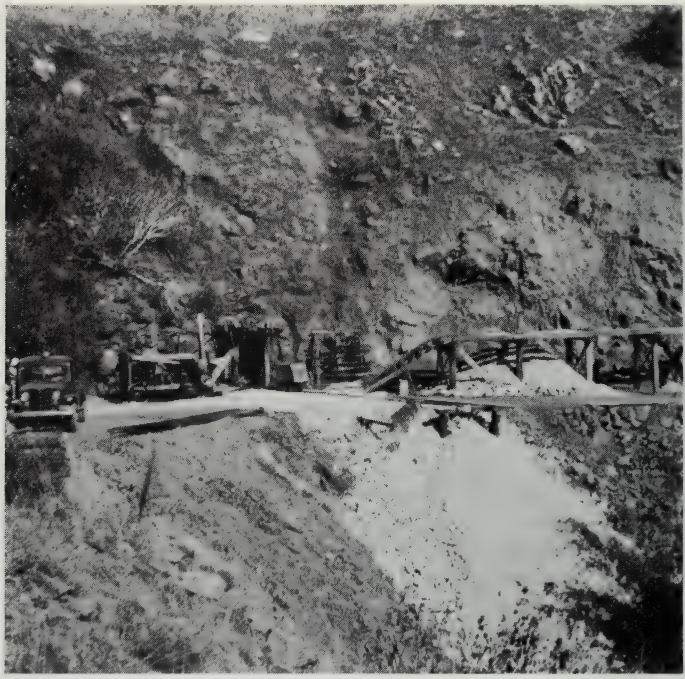

FIGURE 50. One of the adits and a small ore-pile at the Blue Dipper group of tungsten claims operated by Incline Mining Company. The mines are in El Portal district 6 airline miles southwest of Crane Flat on Highway 120.

Blue Dipper Group. Location: Secs. 2, 11, T. 3 S., R. 20 E., M.D., on steep terrain on the east side of Dry Gulch 3½ airline miles northwest of El Portal. Approached by about 12 miles of dirt road from Crane Flat on Highway 120. Ownership: L. W. and W. J. Barnett, Box 33, El Portal, California, John Milanovitch estate, Box A., El Portal, California, and Otto Mayer, Box 33, El Portal, California 1954), hold several claims. Under lease to Incline Mining Company, Lee Cuneo, L. Garribotti, et al., of San Francisco.

The Blue Dipper mine is a recent discovery on which there has been considerable capital outlay in road building and other development work. Some ore was produced and milled at the Incline Mining Company mill on the Merced River during 1955 before the November-December floods washed out the road to the mine. Operations were scheduled to continue later in the spring of 1956.

Scheelite occurs in tactite in a small pendant of limestone cropping out over an acre or two of very steep terrain. The general strike of the tactite bearing limestone is N. 30° W. and the dip is 70° northeast. The limestone pendant is bordered on the east by horblende granodiorite or quartz diorite. The tactite is crudely banded through increase in the garnet and epidote content. The chief mineral in the tactite is quartz with subordinate calcite, garnet, epidote, pyrrhotite, scheelite, tremolite and wollastonite. Some scheelite occurs in the granodiorite which has intruded the pendant in small patches and to some extent in the bordering granitic massif. The ore averages about 0.75 percent

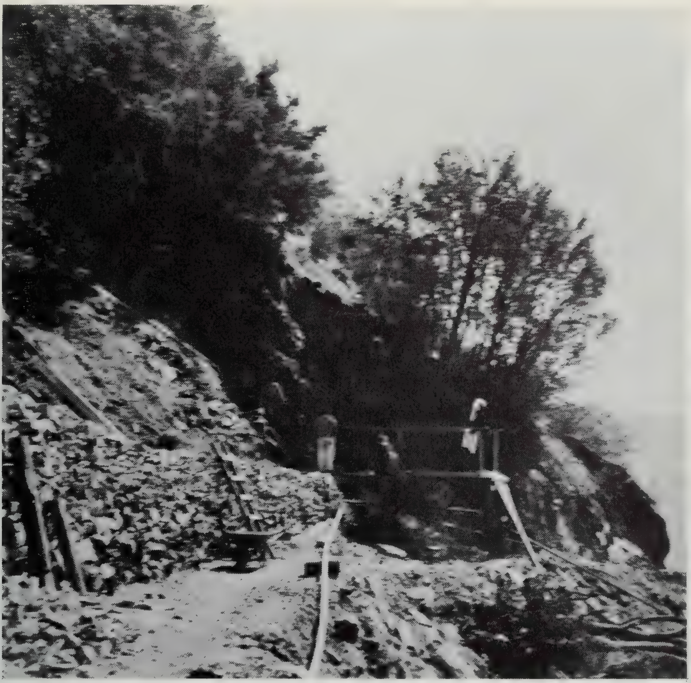

Figure 51. Ore pile and adit portal at the Blue Dipper group of tungsten mines in El Portal district. Scheelite ore is disseminated in garnet-epidote tactite near a granite contact with limestone.

tungsten. In August 1954 the principal workings were an upper tunnel, with several galleries, striking N. 55° E. and about 100 feet long. Scheelite ore was almost continuously exposed in this tunnel. A second tunnel has been driven southeast about 65 feet below the main tunnel. This was about 50 feet long in August 1954.

Zinc

Complex ores containing substantial amounts of zinc, copper, and lead and minor amounts of gold and silver have been found in Mariposa County in a narrow, northwest-trending belt astride the Merced River between Hornitos and Webb Station. The principal mines in this belt are the Blue Moon and the American Eagle. Nearly all of the zinc production for Mariposa County was made during the World War II years, notably 1944 and 1945, when the Blue Moon mine produced 14,687,920 pounds (Eric and Cox, 1948, p. 145).

Minor amounts of zinc are present in most gold ores of the county but not in quantities sufficiently large to attempt recovery. Zinc is an undesirable constituent in gold ores and concentrates that are to be smelted, and if present in more than trace amounts many commercial smelters assess a penalty on shippers proportional to the amount of zinc present. Consequently, zinc is seldom recovered as a by-product of gold mining.

The principal zinc-bearing mineral is the sulfide sphalerite, both in the complex zinc-copper-lead ores and in the gold-quartz veins. In the zinc belt ore commonly occurs in steeply dipping tabular masses in shear zones in hydrothermally altered greenstone. In the gold-quartz veins sphalerite generally is sparsely disseminated through the ore shoots along with other sulfides such as pyrite, galena, tetrahedrite, arsenopyrite and galena.

Akoz (B.A.B., Radium, Asposozien) Mine. Location: Secs. 9, 10, T. 4 S., R. 15 E., M.D., near Webb Station on the Merced Falls-Granite Springs road and 5¼ airline miles north of Merced Falls. Accessible by three quarters of a mile of dirt road from Webb Station. It is 7.8 miles from Merced Falls. Ownership: Carlin Estate, c/o Mrs. P. Erickson, La Grange, California.

The Akoz mine apparently was prospected prior to 1900 and may have produced a little gold-silver ore from the surface oxidized zone, but there is no early record of production. In the early 1900's the unusual triboluminescence of the sphalerite was mistaken for the glow given off by radium, and a small quantity of ore was mined, pulverized and marketed for medicinal purposes by the Asposozien Company. At that time the mine was variously known as the Radium, Akoz and Asposozien, Akoz being the trade name of the pharmaceutical product. A 90-foot shaft was sunk during this operation.

About 1941 the mine was leased by a partnership of L. M. Brady, E. M. Aldrich and Menard Brihten (Wiebelt, 1947, p. 3) and the mine was renamed the B.A.B. Under this management considerable stripping was done and the shaft was reopened to the 60-level. In 1944 about 81 tons of ore was shipped that yielded 1.41 oz. of gold, 52 oz. of silver, 1068 pounds of lead and 3623 pounds of copper. Zinc was not recovered from any of this ore and there was no attempt to recover lead or copper from part of it. The yield was between $5 and $6 per ton (Wiebelt, 1947, p. 3).

Further development work was done between 1944 and 1946, the latest by F. H. A. Williams of New York. This culminated in the sampling and diamond-drilling of the deposit by the U. S. Bureau of Mines in 1946. Mining was discontinued in 1947 and no further work has been done.

The following discussion is derived chiefly from the U. S. Bureau of Mines Report of Investigations No. 4144 by Frank J. Wiebelt, with minor additions and corrections by the authors.

Ore occurs in irregular replacement masses in micaceous schist derived from greenstone and cut by greenstone dikes. The mineralized zone is roughly 400 by 800 feet in plan and is elongated roughly northwest. Among the primary sulfide minerals sphalerite predominates; other species include pyrite, chalcopyrite and argentiferous galena. Barite and quartz are the common gangue minerals, quartz being present most conspicuously as stringers and pods. The ore has been oxidized almost completely to a depth of 35 feet and partly oridized 15 feet deeper. The best precious-metal ore has come from the oxidized zone but the best zinc-ore lies below the oxidized zone. A sample taken by the U. S. Bureau of Mines across a width of 3 feet of massive sulfide ore at a depth of 55 feet in the main shaft tested 0.12 oz. of gold and 10.9 oz. of silver per ton and 12.83 percent zinc, 0.79 percent lead and 0.87 percent copper. None of the other samples taken underground contained over 3.5 percent zinc and 3.2 oz. of silver per ton and none of the surface samples contained over 3.5 percent zinc. The principal values in the near surface samples were in silver and gold, several of the samples being in the range of 9 to 21 oz. of silver per ton. Complete sampling and diamond drill data are listed by Wiebelt (pp. 4-6).

The principal working at the Akoz mine is a 90-foot shaft from which short drifts were run from the 35, 60 and 90-foot levels. This is on the main ore zone which is also developed by numerous surface cuts. About 800 feet east of the main shaft is a second shaft 15 feet deep. Promising ore apparently was not found there as there are few additional workings.

American Eagle (Bullion Hill, Blue Bell and Bonanza) Mine. Location: N. ½, Sec. 30, T. 4 S., R. 16 E., M.D., 3 miles by road northwest of Hornitos. Adjoins the Blue Moon mine on the south. Ownership: Jack I. and Irene Kopp (⅓), 650 Liberty St., Santa Clara, California, Edward C. Morrison (⅓), Korbel, California, and Valberde Brothers, Box 568, Portola, California.

The American Eagle mine is an old property worked in the 1890s and early 1900s for gold and silver. A substantial amount of gold was produced in 1899 and the 300-foot-long American Eagle adit was driven. Owners in 1910 were listed as L. Valberde and John Morrison and the mine was being operated by the Bullion Hill Mining Company. (Min. and Sci. Press, vol. 90, 91, several entries). Considerable ore was shipped. In 1911 the mine was sold to J. M. and A. L. Richardson of Minneapolis and a Huntington mill was installed. The mine fell idle about 1912 and little was done with it until about 1942 when F. H. A. Williams of New York did some development work and shipped some ore (Eric and Co., 1948, p. 143). The property has been inactive since 1942.

The American Eagle and Blue Moon mines were intensively explored and studied by the U. S. Bureau of Mines and the U. S. Geological Survey during World War II. The following discussion is abstracted largely from the report on the American Eagle and Blue Moon mines by U. S. Geological Survey geologists J. H. Eric and M. W. Cox published in California State Division of Mines Bulletin 144 (1948, pp. 133-150).

There are six overlapping, en echelon mineralized zones on the American Eagle property strung out in northwesterly direction over a length of over 1000 feet. Only one, zone A, the most westerly, penetrated by the main crosscut adit, gives promise of bearing ore of economic grade and quantity. This has been explored for a strike length of about 200 feet and varies from a few inches to 4 feet wide. Sixteen channel samples cut from the bottom and sides of a 40-foot winze, sunk on zone A from the adit level at a point about 60 feet north of the crosscut yielded assays within the following ranges:

copper	1.53 to 11.01 percent
zinc	2.59 to 8.29 percent
lead	0.71 to 1.02 percent
gold	0.01 to 0.22 oz. per ton
silver	0.99 to 2.58 oz. per ton

The ore body where the samples were taken is about 4 feet wide and consists of partly oxidized sulfides. Ore minerals include sphalerite, pyrite, tetrahedrite, galena and chalcopyrite. Gangue minerals are barite, glossy and milky quartz, sericite and calcite. Above the adit level the ore is largely oxidized showing streaks of azurite and malachite. Most of the high-grade gold-silver ore taken out in early days came from near-surface, oxidized ground.

Ore bodies tend to be tabular and are elongated parallel to the schistosity of the enclosing schist. The principal mineralized zone is found in sheared felsite breccia or tuff near its contact with massive felsitic volcanic rock. These metavolcanics are cut by greenstone dikes. The ore-enclosing schist has formed by shearing and hydrothermal alteration of the metavolcanic rocks.

Most of the workings of the American Eagle mine connect with the main crosscut adit-level which penetrates about 120 feet below the top of the ridge. This adit is somewhat sinuous and is driven slightly north of east for about 300 feet, intersecting both ore zone A and a secondary zone (named B). From the adit level is a 100-foot southeast drift driven on ore zone B and a 200-foot sinuous drift driven slightly west of north from the crosscut, largely on ore zone A. About 60 feet north of the crosscut adit is the winze previously mentioned and just north of the winze is a 100-foot raise to the surface. South of the winze is a short stope about 25 feet high. The surface croppings of the various mineralized zones have also been explored by about 50 shallow trenches, pits and shafts.

Although zinc and copper are the principal constituents of the complex ores at the American Eagle mine, the principal production, in regard to value, has been in gold and silver. A satisfactory total production figure is not available for this mine.

Blue Moon (Blue Cloud, Red Cloud, Porcupine) Mine. Location: Secs. 19, 30, T. 4 S., R. 16 E., M.D., 4 airline miles northwest of Hornitos. Accessible by 5 miles of dirt road from the paved Hornitos-Bear Valley road, the turnoff being 1.2 miles north of the Merced Falls-Hornitos-Mt. Bullion road. Ownership: Not determined. Last operator (1945) was Hecla Mining Company of Wallace, Idaho. The property includes the Porcupine, Porcupine Fraction and Blue Moon group of claims.

Although the Blue Moon deposits were probably discovered and superficially worked for gold and silver at various times during the last half of the nineteenth century, all but a minor fraction of the production was made between 1943 and 1946 under the impetus of the wartime demand for base-metals. A little gold, silver and copper production was recorded during the middle 1930s from near-surface oxidized ore (U.S. Bureau of Mines records). From 1940 to 1943 the Red Cloud Mines, Inc. explored the mineralized zones by shallow underground workings and by diamond drill-holes aggregating 5000 feet. Two zones containing promising deposits were outlined as well as an additional silicified ore zone bordering the west ore zone on the north. In 1943 the property was taken under active exploitation by Hecla Mining Company of Wallace, Idaho. The mine was equipped to handle 200 tons of ore daily and flotation concentrate was made at the mill of the Washington mine, 4 miles distant to the southeast. Mining ceased in November 1945 because of caving in the mine and because of the uncertainty of postwar conditions. The property has been idle since 1945.

The total production of the Blue Moon mine has been in excess of $2,054,000, nearly all of the total having been between 1943 and 1946. During this period the 55,656 tons of complex ore mined yielded nearly $37.00 per ton—$4.78 per ton in precious metals and $32.07 per ton in base metals, predominantly zinc. Consequently the Blue Moon mine ranks among the 11 highest producing mines in the country and is by far the highest producing base-metal mine in the county.

The following discussion on the geology and workings of the Blue Moon mine is drawn largely from Eric and Cox (1948, pp. 145-148). The property was studied in detail as part of the wartime investigation of the foothill copper-zinc belt by the U. S. Geological Survey.

Ore occurs in 3 outcropping, tabular, mineralized zones in altered sericite schist derived from sheared, fragmental, andesitic volcanic rocks by hydrothermal alteration. The No. 1 ore body is a lenticular mass striking north to N. 15° E. and dipping west at angles varying between 48° and 87°. It is an irregular, lenticular mass reaching a maximum width of 38 feet and a strike length of 180 feet, and has been worked to a depth of 450 feet. The No. 2 ore body, separated from the No. 1 mass by 10 to 20 feet of sheared tuff-breccia roughly parallels the main body. It has an average width of 5 feet and a strike length of about 80 feet at the 165-foot level, but is believed to pinch out both above and below the 165-level. It apparently converges and joins the No. 1 ore body at its south end. This ore body has not been exploited. A third mineralized zone in the vicinity of the Number 2 shaft is believed to be a southern extension of the main ore zone. About 40 feet of unmineralized material separates the No. 1 and No. 3 ore bodies. Its stope length varies from 50 to 80 feet and its width from 4 to 9 feet. Ore extends well below the 165-foot level but has not been exploited beyond that depth. The ore body strikes N. 5° E. and dips about 80° west.

About 160 feet west of the No. 1 shaft is a silicified zone not mineralized at the surface but containing sulfide ore at depth as demonstrated by several diamond drill holes. This zone has not been exploited but is believed to contain several lenticular, south-plunging ore bodies carrying 6 to 10 percent zinc and having a higher lead content than the main ore zone. Detailed data concerning the geology, and disposition of ore bodies and workings of both the main and west ore zones are contained in the paper by Eric and Cox, previously cited.

The mineralized zones are found in metavolcanic rocks of the Peñon Blanco formation of the Upper Jurassic Amador group (Taliaferro, 1943, pp. 283-284). This belt of rocks trends about N. 10-20° W. and dips steeply east. Felsitic greenstone and greenstone tuff-breccia are the principal rock types in which mineralization took place and shear zones controlled the influx of mineralizing solutions.

The principal working at the Blue Moon mine is a 500-foot shaft, the No. 2 inclined 80° W. with levels at 125, 165, 275, 385 and 450 feet. There are about 200 feet of drifts and subsidiary workings on the 125-level, 600 feet on the 165-level, 250 feet on the 275-level, 225 feet on the 385-level and 150 feet on the 450-level. Two hundred and fifty feet south and slightly east of the main or No. 2 shaft is the No. 1 shaft originaly 35 feet deep but later connected to the 165-level of the main working by a raise. In addition to these underground workings there are several open cuts, 2 over 100 feet long. The main shaft and adjoining workings are not accessible because of caving.

Primary ore generally consists of sphalerite and pyrite with minor amounts of tetrahedrite, galena and chalcopyrite in a gangue of sericite, barite, clear quartz and calcite. This ore is massive in some places and banded in others, banding being due to sphalerite-rich layers and elongated sphalerite grains. Massive siliceous pyritic rock is found along the foot-wall of the northern ore zone and ore locally consists of massive sphalerite-barite rock. Ore in the main or No. 1 ore body averaged 13.1 percent zinc, 0.36 percent copper, 0.47 percent lead and 0.061 oz. of gold and 3.75 oz. of silver per ton.

Non-Metallic Minerals

Andalusite

Andalusite, an aluminum silicate mineral commonly used in the manufacture of electrical porcelain insulators, occurs rather abundantly in western Mariposa County in black slate, phyllite and schist which have undergone contact metamorphism. Andalusite-bearing slates and schists most commonly are found within a few hundred yards of granitic intrusions but occasionally occupy still larger zones adjacent to large intrusions. In many of the occurrences the andalusite is in the form of the variety chiastolite, which contains some organic matter and is commonly altered in some degree to pinnite, a hydro-mica. Chiastolite and pinnitized chiastolite have little economic value, but unaltered andalusite, when present in high concentrations near to transportation, has potential economic importance. The authors have examined one such occurrence described below, and there undoubtedly are others along the foothill belt, particularly in Indian Gulch and Raynor Creek quadrangles.

Southwest of Three Buttes Deposit. Location: SW¼ sec. 17, T. 6 S., R. 16 E., M.D., astride the Indian Gulch-Planada ranch road 1¼ miles southwest of Tres Cerritos or Three Buttes. Accessible from Indian Gulch by 4¼ miles of unimproved dirt road or from Highway 140 via the old Merced Falls dirt road, a distance of 6½ miles.

Ownership: not determined, probably Ed. P. Waltz, Reno, Nevada. On patented agricultural land.

The Southwest of Three Buttes deposit is undeveloped. Andalusite occurs in colorless-to-pink, glassy crystals averaging 3x6 mm in section and 20 mm long. Only a small percentage of the crystals contain organic matter and none appear to be pinnitized. Andalusite-bearing slate crops out over an area of at least 1 acre on rolling terrain, the concentration of andalusite in the slate varying from 15 to 25 percent.

Asbestos

There are numerous occurrences of both cross-fibered chrysotile asbestos and slip-fibered tremolite asbestos in the serpentine masses of Mariposa County. Thus far no concentrations of economic importance have been found. Serpentines along Highway 49 between Bagby and Coulterville contain veinlets of cross-fibered chrysotile from a fraction of a millimeter to 3 mm wide but the chrysotile does not make up more than a few percent of the rock. It is possible that a systematic search

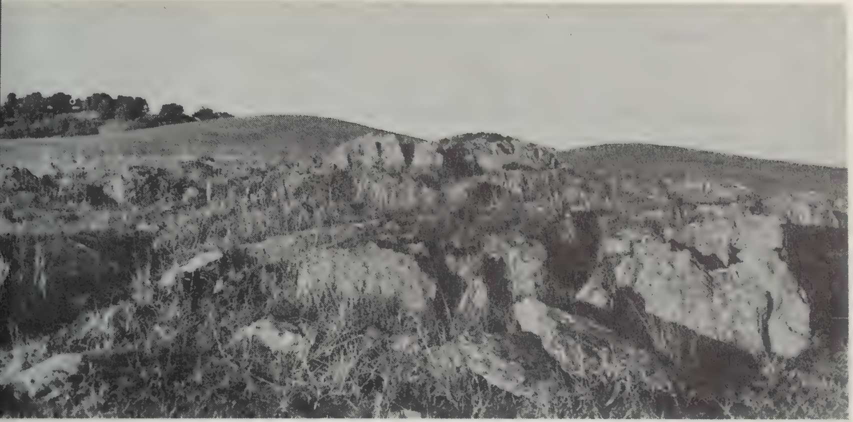

FIGURE 52. Outcroppings of chiastolite-mica schist in the Three Buttes district ½ miles southwest of Indian Gulch. Such rock develops from slate by heating of the rock near a granitic intrusion. The chiastolite variety of andalusite has little economic value except for semi-precious gems, but fresh, glassy andalusite when found n large concentrations has potential value as a source of aluminum silicate for porceain insulators. *Photo by Mary H. Rice.*

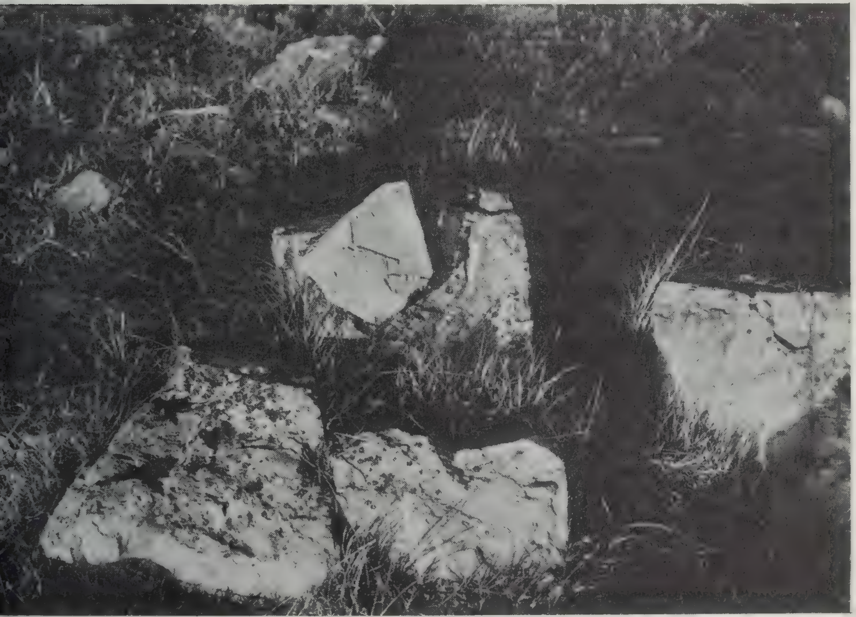

FIGURE 53. A closeup view of large chiastolite crystals in mica schist from the ame series of outcrops shown in figure 52. Some of the crystals are several inches ong and half an inch across. *Photo by Mary H. Rice.*

of the serpentine masses of the county would reveal locations worthy of development.

Barite

Large deposits of barite have been found in the El Portal district in the Pigeon Gulch-Rancheria Flat vicinity, astride State Highway 140, and on a ridge lying between Devils Gulch and Granite Creek 2 miles northwest of Chowchilla Mountain. The two districts are about 6 airline miles apart. In the El Portal district massive, medium-to-fine-granular barite occurs in vein-like masses in metasediments of the Calaveras group. Associated rocks are quartzite, limestone, slate, phyllite and schist. In the vicinity of Chowchilla Mountain barite also occurs in the Calaveras group of rocks in massive quartzite and micaceous quartzite without apparent association with limestone.

Barite also occurs in large quantities as a gangue mineral in the zinc-lead-copper ores of the Blue Moon and American Eagle mines northwest of Hornitos. Thus far no attempt has been made to recover barite from these ores.

Almost all of the barite production of Mariposa County has come from El Portal mine, most of this production being between the years 1910 and 1948. Within this period 398,613 tons of barite was marketed, valued at $2,760,493. This amounts to about 73 percent of the total California production of barite and compares favorably with the production of many of the best gold mines. Mariposa County remains one of the largest potential producers of barite in California, but present market requirements are such that ore must be either very selectively mined or else ordinary mine-run material must be beneficiated (upgraded). Mines in Nevada currently supply most of California's barite requirements.

Egenhoff (Devils Gulch) Deposit. Location: Secs. 17, 21, T. 4 S., R. 20 E., M.D., near the top of the main ridge that lies between Granite Creek Canyon and Devils Gulch, 2 miles northwest of Chowchilla Mountain and 4½ airline miles east of Jerseydale. Accessible by 1½ miles of trail from the end of the U. S. Forest Service road on Chowchilla Mountain. Ownership: California Barite Corporation, c/o Edwin Earl, 1102 Rowan Building, Los Angeles 13, California owns a patented property of 44 acres which includes the Barium No. 2, Barium No. 3 and North Barium Fractional claims. The company also holds 3 unpatented claims, the Barium No. 3, South Fractional and Camp Lode claims.

This deposit was discovered in 1917 by W. D. Egenhoff who did extensive exploration and development work on the property. Sold to the California Barite Corporation in 1929, about $50,000 was spent by this company in further development work (Laizure, 1935, p. 46) during the early 1930s. The only substantial production recorded from the mine was in 1937 when about 800 tons was marketed.

The authors are indebted to Charles J. Kundert, formerly barite specialist for the Division of Mines, for most of the following data. Mr. Kundert visited the property in October, 1955.

Barite occurs in metasedimentary rocks of the Paleozoic Calaveras group. The barite-bearing beds are nearly everywhere enclosed in massive, blue-gray quartzite which strike N. 25° W. and dip 65° northeast.

Within a foot of the contact of quartzite with the barite rock the quartzite is micaceous. The barite rock is white, granular and contains some silica. Part of the 1937 production was reported to be witherite, indicating that the character of the ore at the Egenhoff and El Portal deposits is similar, but no witherite was observed on the property at the time of Mr. Kunderts' visit in October 1955. The barite rock is foliated parallel to the borders of the ore masses, the foliation planes being about 2 inches apart and most conspicuous near the contact with the enclosing micaceous quartzite. A brown carbonate mineral, probably calcite, occurs along the foliation planes and as blotches throughout the barite rock. No data are available as to the barite content of the ore.

The barite horizon is readily traced for 50 feet southeast of the main adit portal and for a hundred feet to the northwest. According to Laizure (1928, p. 144) the horizon has been traced for a total distance of 4500 feet. In 1942 the owners reported that 2000 tons of ore remained on the dumps and that 25,000 tons had been blocked out in the mine.

Workings consist of a drift adit at least 100 feet long, which develops extensive backs, and numerous surface cuts. The adit is driven N. 25° W. from a gulch which indents the southwest side of the main N.-NW. trending ridge. More than 50 feet of backs are developed toward the rear of the adit.

El Portal Barite Mine. Location: Secs. 18, 19, T. 3 S., R. 20 E., M.D., astride Highway 140 and the Merced River 1½ miles west of El Portal. Ownership: El Portal Mining Company (a subsidiary of Baroid Division of National Lead Company), c/o R. J. Groves, Trust Department, American Trust Company, 464 California St., San Francisco 20, California, owns a patented property of 81.42 acres which includes the Barium 1 and 2, North Barium and South Barium claims.

According to Young (1930, p. 7) the North mine of the El Portal Barite property was discovered and first worked in the 1880s; the South mine was discovered later. First production was recorded in 1910 by the El Portal Mining Company of San Francisco (a different group than the present owners), which operated the mine intermittently until about 1914. Barbour Chemical Company of Alameda operated the property under lease for a short period in 1914-15 (Lowell, 1916, p. 571), and the Western Rock Products Company had it for some time in the early 1920s. In 1927 the mine was acquired by Yosemite Barium Company of El Portal. This company opened up the series of lenses south of the Merced River called the South Mine (Laizure, 1928, p. 144). In 1929 or 1930 the National Pigments Company succeeded the El Portal Mining Company as operators. This company and its subsequent reorganizations, the National Pigments and Chemical Division and Baroid Division of National Lead Company, operated the mine more or less continuously until 1948. The property has been idle since 1948 because more satisfactory ore can be procured from the company's mines in Nevada at less cost than can be met at the El Portal plant. Loss of rail facilities when service was discontinued on the Yosemite Valley Railroad was the main factor behind discontinuance of operations of the El Portal mine.

The barite masses occur as apparent replacements in metasediments of the Paleozoic Calaveras group. In the South Mine some limestone is found adjacent to the barite-bearing zone and the barite masses have

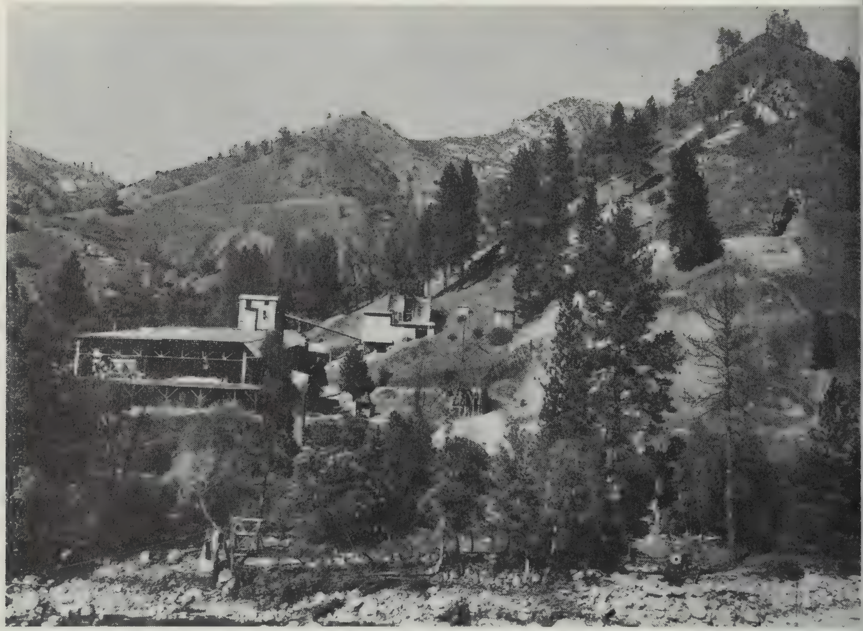

FIGURE 54. Mill installation and mine workings at El Portal barite mines astride Highway 140 between Briceburg and El Portal. Barite-witherite rock was mined chiefly for use in weighting oil-well drilling-mud. Workings of the North mine, shown at the right of the photo, are in two parallel veins of grayish-white rock which strike directly away from the observer and dip very steeply toward the right (east). The lenticular masses of rock range from 3 or 4 feet in width to more than 20 feet in width and have been mined to a depth of over 200 feet with no lessening of ore at depth. To keep producing a uniform product having a specific gravity of 4.2 it was necessary to beneficiate or upgrade the ore by flotation in the mill seen at the left of the photo. The mines closed down about the time that service was discontinued on the Yosemite Valley Railroad in 1944. *Photo by Mary H. Rice.*

long been considered to be replacements of limestone. Whatever the nature of the parent rock, the barite occurs in apparently homoclinal sequences of beds associated with quartzite, slate, schist and phyllite.

In the North Mine the main barite-bearing zone ranges from 4 to 20 feet wide, dips 70° west and, although slightly sinuous because of local thickening and thinning, strikes generally N. 12° E. Within the barite zone the rock is principally a light-gray to white granular, crystalline rock. In most places it is about 85-90 percent barite and in other places barite is mixed with considerable calcite and quartz. Clean, white barite rock commonly occurs in lenticular masses flanked by several feet of more impure, sheared material. Contorted structures formed by plastic flow of the barite rock are common within the main ore body. The barite rock is most commonly a dense, equigranular aggregate of grains averaging less than half a millimeter in longest dimension. It is commonly banded parallel to the walls of the tabular ore bodies, the darker colored bands containing the most impurities. Impurities include grains of quartz, pyrite, sphene, tourmaline, magnetite, chlorite, actinolite and a green pyroxene (Fitch, 1931, p. 462). Witherite locally is abundant and in places forms distinct ore bodies. In other places calcite takes the place of the normally more abundant barite and the rock approaches a crystalline limestone in composition and appearances. Ore normally contains about 85 percent barite but was beneficiated to about 94 percent $BaSO_4$ (Julihn and Horton, 1940, p. 169; Young, 1930, p. 71).

A second roughly parallel barite bearing-zone has been developed 75 to 100 feet west of the main zone. This zone, although from 1 to 3 feet narrower than the main zone, is similar in other respects. South and east of the North mine across the Merced River is another southeast-trending group of tabular barite masses which have had considerable development work done upon them. Wall rocks are slate and metachert having cleavage and bedding in most places parallel to the planarity of the barite masses. Locally, however, the barite zone bevels the edges of the beds. The barite zones are sharply defined between walls of metachert and slate. There are no limestone strata in the vicinity of the North mine except the calcitic matter found in the barite zones themselves. There is a strong suggestion that the barite zones are actually metamorphosed fissure-vein deposits and not replacements of a preexisting bed of limestone. Detailed field and petrographic work would be necessary to determine whether or not this suggestion is correct.

The main barite zone is developed by a long adit which begins as a northeast-trending crosscut and then veers north and follows the vein. The line of overhand and underhand stopes developed from this adit has almost obliterated the haulageway in some places. The stopes are open to the surface for long distances and the zone has been mined for nearly 1000 feet north from the adit entrance. The second productive zone has been developed by several crosscut adits which connect with a long line of stopes that are open to the surface. These aggregate about 500 feet of strike length.

Geologic conditions at the South mine are similar to those at the North mine, although the strike of the ore zone is more to the northwest. Varying from a width of 6 inches to more than 20 feet the lenticular masses strike N. 45° W., upon the average, and dip 70° northeast (Kundert, C. J., field report dated in August, 1953). The higher grade shoots vary in length from 50 to 300 feet. Ore varies from white, uniform, medium-grained material to dark-colored, intricately banded rock having abundant pyrite in very fine particles (Julihn and Horton, 1940, p. 169). It commonly contains 85 percent barite, 2-3 percent witherite, 0.5 percent pyrite and about 12 percent quartz, but considerable barite rock falls below 85 percent barite and has not been considered good enough to process.

The South mine is developed by 2 crosscut adits at the same elevation and approximately 150 feet apart driven southwest into the west side of Pigeon Gulch. These connect with a drift level about 1500 feet long. This level is connected by a 90-foot raise to an upper level about 1000 feet long. Ore has been stoped to the surface for several hundred feet above the upper level at the northern end of the mine. None of the workings reach a depth of over 200 feet below the surface (Julihn and Horton, 1940, p. 169) and ore continues below the adit levels for an unknown distance. Reserves of high and medium grade ore in both the North and South mines are believed to be very large.

Good accounts of the processing of the barite ore may be found in Young (1930, p. 71) and Julihn and Horton (1940, p. 169-170). Most of the ore mined was used to add weight to oil well drilling fluids. Ore was transported from the South Mine to the mill on Rancheria Flat near the North Mine by aerial tram. The mill and loading facilities remain intact but have been inactive for several years.

Clay

Clay has not been produced in quantity in Mariposa County thus far, although a little local material may have been burned into common brick prior to 1870. Alluvial clay and clay mantle suitable for common brick and large tile-bodies probably occur at numerous places within the county boundaries. So far as the authors know there has been no systematic search for ceramic materials in the county, due mainly to the distances to market that are involved. Presence of patches of the Eocene Ione formation along the western borders of the county suggest the possibility of the presence of refractory, white clays similar to those mined in Amador and Placer Counties. White clay of unknown extent was encountered in a drill-hole in the Huelsdonk Dredging Company placer ground in sections 5 and 6, T. 4 S., R. 15 E., M.D., on or adjoining the old Prouty ranch 7 miles northeast of Merced Falls (L. L. Huelsdonk, personal communication, 1954).

Limestone and Dolomite

There are immense deposits of carbonate rock in Mariposa County in the Jenkins Hill, Hites Cove, Bower Cave and Exchequer Lake districts. Because the deposits are relatively inaccessible or are a long distance from potential markets, there has been little incentive to develop any of the deposits in recent years. With the exception of the deposits on Jenkins Hill, little has been done on the chemical and physical properties of any of the carbonate rocks in order to determine their best utilization. In general, the carbonate rocks of the Bull Creek-Bower Cave district are either magnesian limestones or dolomites; those of Jenkins Hill tend to be graphitic and slaty (aluminous); and those of the Hite Cove district are at least in part magnesian. Most of the crystalline limestone on the Hite Cove district is a fine-grained gray and white marble that takes a good polish. Some of the rock in the Bower Cove district is similar. The limestone at Jenkins Hill is nearly black because of the presence of about 1½ percent of finely divided graphite (Laizure, 1928, p. 148).

Between 1927 and 1944 a total of 2,430,843 tons of limestone was quarried in Mariposa County, almost entirely from the Emory deposit on Jenkins Hill. Although this was captive tonnage utilized in manufacture of portland cement, it would have been worth between $2,000,000 and $3,000,000 on the open market. Only a small fraction of the reserves were utilized.

Bower Cave Deposits. Location: Secs. 19, 20, 29, 30, T. 2 S., R. 18 E., M.D., astride the Briceburg-Kinsley-Coulterville road 19 to 20 miles by road from Briceburg. Ownership: not determined. Portions of the limestone-bearing land are owned by several individuals.

Lenticular masses of dove-gray carbonate rock crop out along the east side of the Kinsley-Coulterville road from a point about half a mile northwest of Bower Cave southeast for a distance of over 3 miles.

These are part of the metasedimentary portion of the Paleozoic Calaveras group.

There is some high-calcium limestone in the vicinity of Bower Cave, the extent of which is not known to the authors, but most of the rock exposures examined consist mainly of dolomite or a mixture of dolomite and calcite too intimately mixed to mine separately. Much of the rock is dense and fine to medium-grained and will take a high polish, but the colors are not particularly attractive for use as marble in building facings etc., and the deposits are rather remotely situated from transportation and markets. None of the deposits have been developed or adequately sampled so far as the authors could find out.

Cotton Creek Deposit. Location: Sec. 18, T. 4 S., R. 16 E., M.D., just north of the Cotton Creek arm of Exchequer Lake 3 airline miles southeast of Granite Springs School. Accessible only by trail from a ranch road leading southeast from Granite Springs School. The old road from Hornitos has been inundated by Exchequer Lake. Ownership: not determined.

A small tonnage of limestone was quarried and burned into lime at the deposit prior to 1910. No recent work has been done. The limestone occurs in a narrow, northwest-striking lens enveloped in slaty and schistose marine metasediments of Upper Jurassic age. The limestone is dense, fine-grained, gray rock apparently high in calcium and low in magnesium and other impurities. No chemical analytical data are available on the deposit. The mass is several hundred feet long but does not exceed a hundred feet wide, and in most places is much thinner than that. Except for a few small pits the mass is undeveloped.

Jenkins Hill (Emory, Richardson, Timertone, Yosemite Cement) Deposit. Location: Secs. 7, 18, T. 3 S., R. 19 E., M.D., high on the west side of Miller Gulch 1 mile north of the Merced River and Highway 140 and 8 miles northeast of Briceburg. Ownership: Johnny Richardson, 1124 South Fifth Avenue, Arcadia, California owns several claims covering most of the limestone-bearing land.

The Jenkins Hill deposit was put into production in 1927 when the first rock was shipped to Merced for use in manufacture of portland cement. Between 1927 and 1944 approximately 2,430,843 tons of limestone was quarried. Production ceased in 1944 when service on the Yosemite Valley Railroad was discontinued. Limestone was quarried from long benches situated about 800 feet above the railroad grade, put through a 30-inch gyratory crusher and a heavy-duty hammer mill, delivered to the upper storage bin by belt conveyor, and transferred to the railroad-side storage bin by electrically driven, cable-drawn incline cars. Each car carried 20 tons of minus-one-inch rock and could travel at a rate of 500 feet per minute. All equipment and supplies were delivered to the quarry area by the inclined cableway track which was nearly 2000 feet long. The limestone was broken by massive blasts which brought down as much as a million tons of rock.

Limestone is found in a north-trending lenticular mass nearly half a mile long and several hundred feet wide at the thickest part of the lens. The strata dip about 80° east. The mass crosses Miller Gulch and continues south as far as the Merced River, but it has narrowed to less than 50 feet wide at that point and is quite slaty. The limestone is ex-

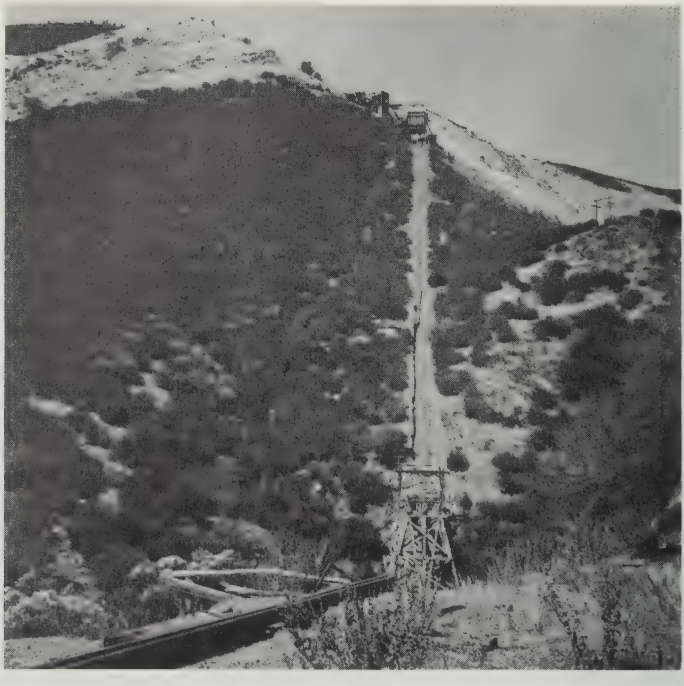

FIGURE 55. Trestle, incline and rock-storage bin at the former Yosemite Cement Company property near Jenkins Hill north of Highway 140 between Briceburg and El Portal. The limestone, a black, rather slaty rock, came from quarries located off of the photo to the right rear. More than 2 million tons of rock was quarried during the 17 years of operation.

posed by erosion for a depth of more than 800 feet and continues below the bottom of Miller Gulch for an unknown depth. The limestone is dark-gray to black and rather thinly bedded. The magnesium oxide content averages considerably less than 3 percent. Little else regarding its chemistry has been recorded, but some of the rock is slaty and therefore aluminous. In the manufacture of cement the limestone was blended with alluvium taken from pits near Merced. Only a small percentage of the reserves were depleted but the deposit is a mile north of Highway 140 on rugged terrain and nearly 60 miles to the nearest rail-shipping point at Planada.

Kinsley (Jenkins Ranch) Deposit. Location: Secs. 4, 9, T. 3 S., R. 18 E., M.D., on the Jenkins ranch half a mile west and slightly south of the Kinsley guard station of the U. S. Forest Service and about 11 miles by graded dirt road from Briceburg. Ownership: on patented agricultural land, mostly part of the Jenkins ranch near Kinsley.

Light gray to grayish white limestone crops out over several acres about half a mile southwest of the Jenkins ranch house. The rock is a fine-grained dolomitic marble but no chemical or physical data on it are available. The deposits are undeveloped and the reserves are unknown. Distance from market, lack of heavy-duty transportation facilities and the magnesian character of the rock have hindered development of the deposit.

Marble Point (Bondshu, Hite Cove) Deposits. Location: Sec. 2, T. 4 S., 19 E., M.D., on the south side of the South Fork of the Merced River 1½ miles south and slightly east of Hite Cove. Accessible by 7 miles of jeep trail from Jerseydale.

The Marble Point deposit is a large, undeveloped mass of finely crystalline carbonate rock much of which is reported to be good quality commercial marble. The type rock is white with dark veining and is dolomitic. The carbonate mass reaches a width of 3000 feet, is more than half a mile long and has been eroded to a depth of 600 feet. It is slightly elongated north and dips very steeply east. Little or no work has been done on the deposit to determine its physical and chemical properties and it has remained undeveloped because of its inaccessibility.

O'Brien Deposit. Location: N¼, NE¼, sec. 11, T. 4 S., R. 18 E., M.D., near the crest of a ridge about 1 mile southeast of Briceburg. Accessible by 5 miles of graded dirt road, via Trabucco Creek and the Feliciana mine, and 2 miles of truck trail. Ownership: Mrs. Ethel R. O'Brien, et al., 1534 Clay St., San Francisco owns a patented property of 80 acres which includes much of the limestone land.

A northwest-striking, nearly vertical lens of limestone several hundred feet thick can be seen cutting across the ridge east of the Briceburg grade. There has been no production and reserves have not been proven beyond the estimate of several million tons (Logan, 1947, p. 253). The best quarry sites are about 800 feet above the bend of the Merced River. Although the property is 7 miles by road from Highway 140 near Timber Lodge, it would be possible to drop the limestone down to highway level at Briceburg over a distance of only 1 mile—at the expense of losing 800 feet of altitude. Three samples analyzed by Santa Cruz Portland Cement Company (Logan, 1947, p. 253) gave the following results:

Oxide	*Sample 1 (white)*	*Sample 2 (black)*	*Sample 3 (mottled)*
SiO_2	0.28	1.18	0.20
R_2O_3 (R = Al & Fe)	0.60	1.02	0.36
CaO	54.10	53.40	54.60
MgO	not done	not done	not done
$CaCO_3$	96.54	95.29	97.44
Ign. loss	44.22	43.92	44.48

Logan does not state how the sampling was done or from what parts of the deposit the samples were taken, but two-thirds of the deposit contains rock resembling sample No. 3.

Miscellaneous Occurrences. There is a small mass of limestone close to the north side of Highway 49 one mile northeast of Mt. Bullion, but it is not sufficiently large or of sufficient purity to be of economic importance. Another deposit, reported to be 3000 feet long and from 25 to 100 feet thick, is about 1½ miles east of Bagby and about 1 mile north of the Merced River. The deposit, sometimes called the Welch and Farney deposit (Logan, 1947, p. 253), is undeveloped and nothing is known of its chemical or physical characteristics. Small pendants of limestone in granitic rock are reported in the Ben Hur district of southwestern Mariposa County but these are undeveloped.

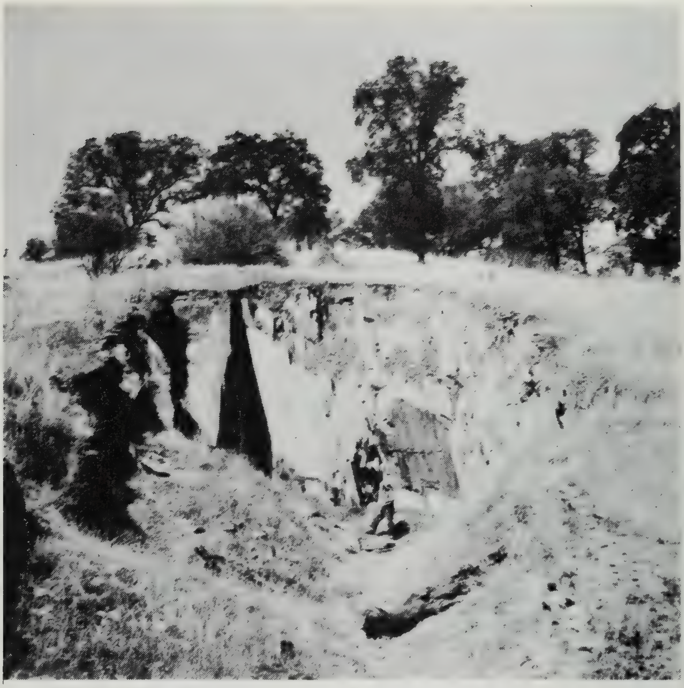

FIGURE 56. One of several muscovite schist quarries along Brushy Canyon in the White Rock district. The rock was ground and used as a lubricant in manufacture of rubber tires. The schist is derived from rhyolite tuff of the Cosumnes member of the Upper Jurassic age.

Magnesite

There is one known occurrence of magnesite in the vicinity of Mormon Bar. There, several narrow magnesite veins are found in weathered serpentine associated with siliceous hot spring deposits (Laizure, 1928, p. 148). No magnesite has been produced in the county and the occurrence is not believed to be sufficiently large to be of economic importance.

Mica

There are large deposits of muscovite-quartz schist in the Brushy Canyon vicinity of the White Rock district 2 miles north and slightly west of White Rock School. The schist has formed from metamorphism or rhyolite tuff of the lowest member of the Upper Jurassic Mariposa group (Taliaferro, N. L., personal communication, 1938). It occurs in at least two northwest trending (N. 55-65° W.) belts that dip steeply northeast. The width of the relatively clean, pearly white schist ranges from 40 to over 100 feet and, in the main zone has a strike length of at least 1½ miles. The main zone is repeated at least once by folding, so that there are two or more subparallel zones separated by several hundred feet of schistose rocks of much lower muscovite content.

Numerous pits and several small quarries expose a considerable tonnage of uniform rock in which quartz is the only major mineral other than muscovite. Several million tons of material could be developed.

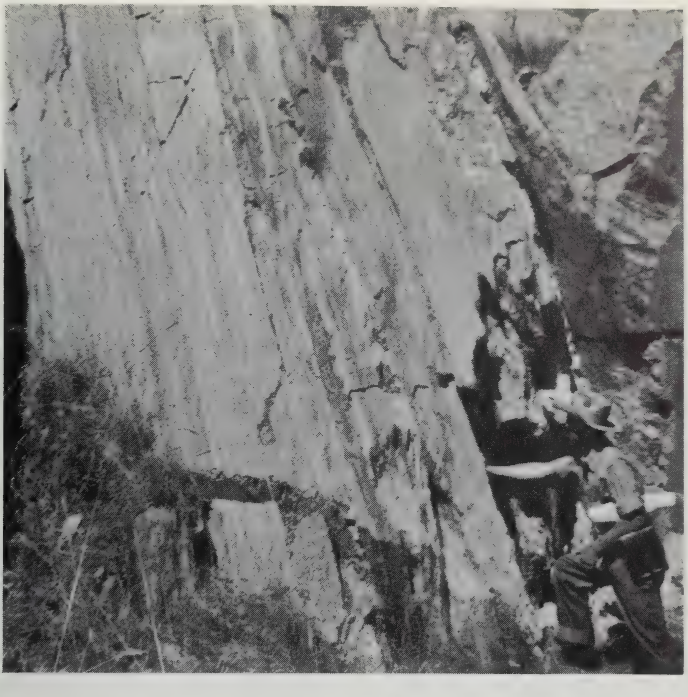

FIGURE 57. Detail of the quarry face in the muscovite schist quarry shown in figure 56. The lightest bands are quartz-rich rock which in places is a troublesome impurity.

The quality of the material is dependent upon the proportion of quartz present, for most uses, and insufficient testing has been done to establish the amounts of rock of various grades that are present. There was a small, intermittent production of the schist in the 1930's and 1940's principally for use as a lubricant in manufacture of automobile tires. So far as the authors know, there has been no production since 1946.

There is one quarry on the main schist zone 15-20 feet wide, 85 feet long and 20-30 feet deep.

A series of open cuts extends north from the main quarry over 400 feet. There are also several pits northeast of the main workings about a quarter of a mile away.

Ornamental Stone

The brightly colored, green variegated mariposite-ankerite-quartz rock from Mother Lode and adjacent vein systems has been finding favor, in recent years, as an ornamental stone in gardens, patios and the like. It has been quarried recently along Highway 49 between Bagby and Coulterville near the Specimen group of gold mines and near the Virginia and Mary Harrison mines. Production has been intermittent because of vagaries of demand and because the select, unstained mariposite rock tends to occur in small masses. The chief detrimental impurity is discoloring iron oxide derived from original sulfide minerals. Select rock brings 20 to 30 dollars a ton on the retail market but selective mining and hand sorting make the initial cost of production high.

Rock, Sand and Gravel for Aggregate

An intermittent production of rock, sand and gravel has been recorded from Mariposa County since 1907. During the period of operation of the Yosemite Valley Railroad there was a substantial production of chert and greenstone for road metal, road base and railroad ballast from quarries near the present location of Exchequer Lake. All activity there ceased in 1944. Sand and gravel deposits in Chowchilla Creek, Mariposa Creek and the Merced River between El Portal and Briceburg have been exploited intermittently in a small way for many years. The rock particles making up these deposits consist predominantly of ancient, dense, volcanic porphyries, quartzite, vein-quartz and numerous varieties of crystalline metamorphic rocks, but in the Ben Hur-Chowchilla Creek area the deposits are predominantly of granitic rock-debris.

The extensive dumps of many of the mines along Highway 49 have been utilized in quantity, from time to time, for fill, road base and macadam. Such rock has also been used sparingly in concrete although not generally as satisfactory as stream gravel. Extensive deposits of quartz sand, the product of the mills operated for gold ore, have yielded substantial tonnages of material for concrete and plaster. The dumps of the old Princeton and Mariposa mills have been nearly depleted of such material. There is a huge dump of crushed quartz south of the Merced River at Bagby but it is not readily accessible and is a considerable distance from potential markets. Inasmuch as the population of Mariposa County is only about 5000 and inasmuch as the mileage of state highways and other surfaced roads is relatively small, there has been little incentive to develop the vast reserves of hard, durable rock found within the county. These include the granites of the Cathay, El Portal, Mormon Bar, Ben Hur, and Schultz Mountain districts; the cherts and greenstones of the Hornitos Bear Valley and Coulterville districts; and the crystalline limestones and dolomites of the Briceburg, Hite Cove and Bower Cave districts.

Mariposa Sand and Gravel Company. This company, a partnership of George P., J. G. and E. C. Greenamayer, operates out of Mariposa and in recent years has operated a crushing and screening plant on Mariposa Creek opposite the fair grounds 1½ miles south of Mariposa. Much of the material processed consists of old dredge tailings. A steady, substantial production has been maintained over the past 5 years or more. The company also produces a little by-product gold and silver.

Other Producers in the Vicinity of Mariposa. W. J. Saye of Mariposa has produced sand and gravel in recent years from shallow deposits on Humbug Creek 2½ miles south of Bootjack. These deposits are chiefly weathered granitic rock that has been moved only a short distance by flood waters of Humbug Creek. In past years the Duke Brothers have produced sand and gravel from Chowchilla Creek about 7 miles south of Mariposa. Paving contractors such as George E. France, Ralph Maxwell and the Piambo Construction Company produce rock intermit-

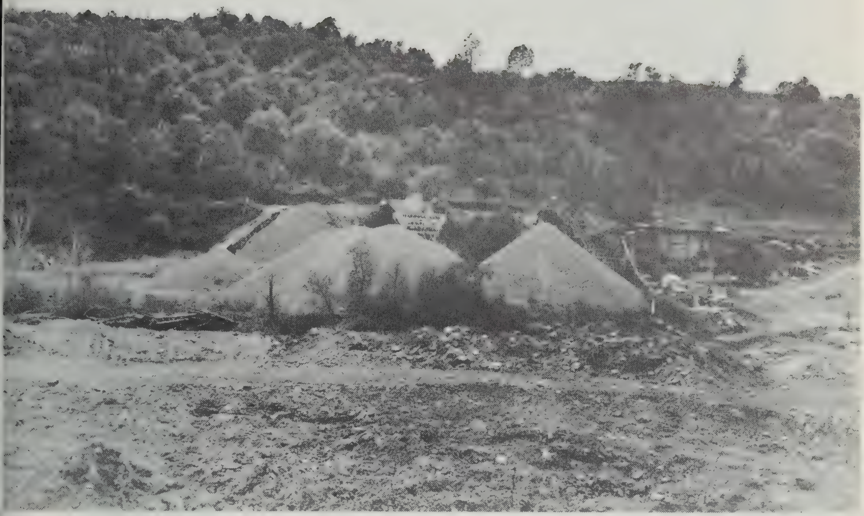

FIGURE 58. The sand, gravel and crushed rock operation of Mariposa Sand and Gravel Company on Mariposa Creek between Mariposa and Mormon Bar. A little placer gold is produced as a by-product. *Photo by Mary H. Rice.*

tently using portable crushers that can be moved to deposits adjacent to their various jobs.

Roofing Granules and Terrazzo Chips

There has been considerable demand, in recent years, for colored, durable rocks for use on built-up, asphalt-base roofs. The red and yellow jasperoid chert of the Jasper Point district would undoubtedly be suitable for this use if satisfactory roads were constructed to the vicinity. No work has been done on them since discontinuance of service on the Yosemite Valley Railroad. The massive greenstones of the Sierra foothills have been utilized in other counties for granules but so far none of the Mariposa County deposits have been activated.

For the past year or two, dark green serpentine has been quarried by the Sonora Marble Aggregates Company from a roadside quarry on Highway 49 approximately 2½ airline miles northwest of Bagby. The quarry is in the NW¼, sec. 19, T. 3 S., R. 17 E., M.D. About once a month the company trucks several loads of serpentine to their crushing and sizing plant at Shaws Flat near Sonora, Tuolumne County. The serpentine is dense and tenacious and has about the same hardness as marble. Production of terrazzo chips in California is pretty well limited to limestone, marble and serpentine because of the way in which the chips are used. Terrazzo walls and floors are made by setting the chips in light-colored, fine-grained concrete and then polishing the surface with carborundum wheels. Materials harder or less tenacious than marble are unsuitable inasmuch as grinding of hard materials is excessively costly and use of materials of mixed hardness tends to yield an uneven polished surface.

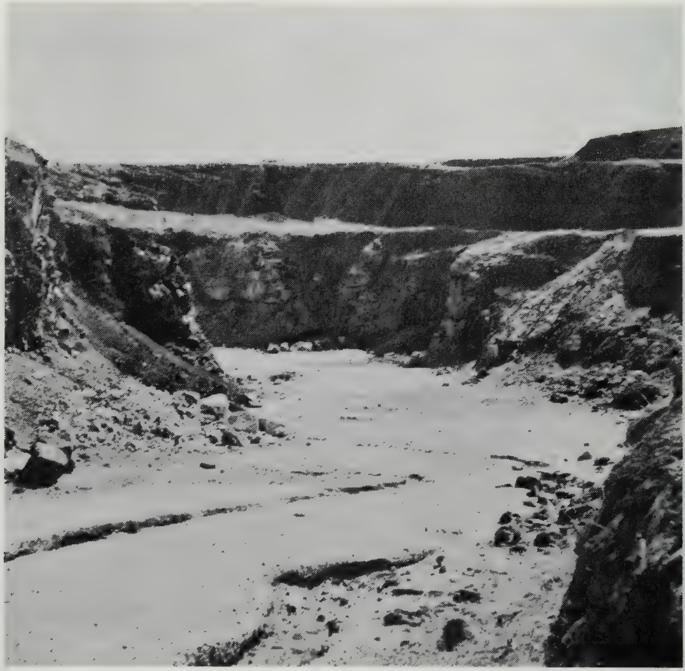

FIGURE 59. LeGrand (White Rock) silica quarry in southwestern Mariposa County just north of the Ganns Creek (LeGrand-Mariposa) road. Between 1942 and 1952 Kaiser Aluminum and Chemical Company produced approximately 148,000 tons of quartz for use in manufacture of ferrosilicon.

Silica

Vein-quartz has been quarried from massive deposits in western Mariposa County for the manufacture of ferrosilicon and, to a minor extent, for chemical and metallurgical use. Between 1942 and 1952 the Kaiser enterprises quarried 147,964 tons of quartz from their White Rock (LeGrand) deposit in sec. 14, T. S., R. 17 E., M.D., for use at their Permanente ferrosilicon plant. This operation was discontinued as the wartime government demand for ferrosilicon fell off. Prior to 1942 there had been a small intermittent production of vein quartz for miscellaneous uses, chiefly in the late 1920's.

There are large deposits of vein-quartz cutting the slate belt that lies between Mariposa and Planada. Unlike the vein matter in the Mother Lode, most of this material is low in sulfides and carbonates and would be a suitable source of high-grade silica. The deposits, however, tend to be of very irregular shape and often require expensive selective quarrying. The potential reserves of silica in this part of Mariposa County run into many millions of tons.

Slate

In common with several other Sierran foothill counties, Mariposa County has immense reserves of black slate suitable for roofing sheets, flagstone and roofing granules. Good quarry sites can be found in all of the three main metasedimentary units in the county, the Paleozoic

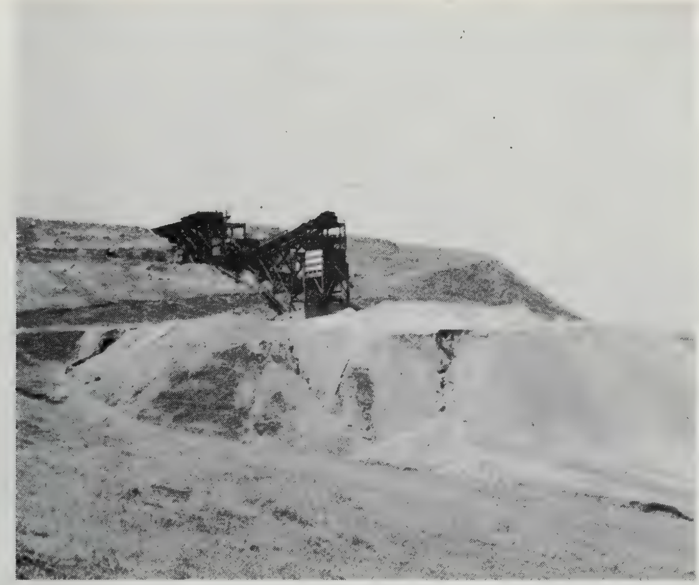

Figure 60. Rock crusher, storage bins and loading facilities at Kaiser Aluminum and Chemical Company's LeGrand (White Rock) silica quarry.

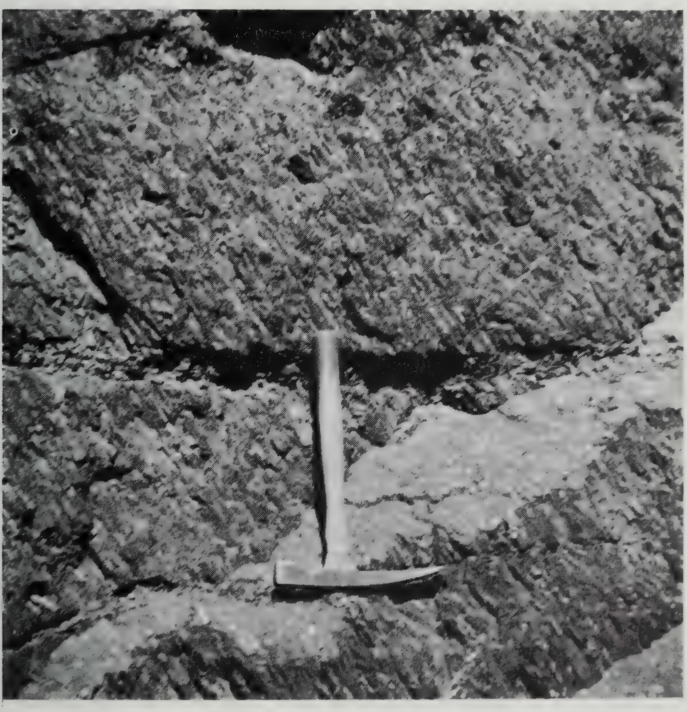

Figure 61. Detail of chiastolite-mica schist forming the south wall of LeGrand silica quarry. Rock was derived by contact alteration of black slate near a granitic intrusion.

Calaveras group, the Upper Jurassic Mariposa slate and in the slaty, tuffaceous parts of the Upper Jurassic Amador group. All of these rock units have broad distribution in the county. At least 20 percent of the land area of Mariposa County is underlain by slate and there are innumerable places where sound, cleavable material can be quarried. Because of the high cost of construction of buildings that are to be roofed with slate there has been no demand for roofing slate in California in recent years. Crushed slate granules for built-up, asphalt-base roofs are used to some extent in California but have not been produced in Mariposa County within the last decade. The most probable outlet for slate at the present time is for flagstone for California's flourishing construction industry. The use of flagstone for building facings, patios and ornamental walls and walks is ever-increasing and although black rock is not in as great demand as the light-colored or strongly colored sandstones and volcanic rocks of Arizona, Nevada and other parts of California, the consumption of slate is sure to increase. Up to the present time there has been no vigorous attempt to put slate flagstone onto the California market. Inasmuch as slate is softer and has a greater tendency to spall than many other kinds of flagstone it is necessary to select the soundest material available in order to successfully compete with these other materials.

During the early part of the present century sheets of good roofing slate were produced by the Cunningham Corporation of Planada from a property covering sections 6, 7, 8 and 17, T. 7 S., R. 17 E., M.D., astride Mariposa Creek 6 airline miles south of Cathay. At about the same time roofing-slate sheets were also produced by Pacific Slate Company of Merced from a property in sec. 16, T. 6 S., R. 16 E., M.D., about 3 miles southwest of Indian Gulch (Laizure, 1928, p. 151). There is a series of small quarries on the northwest side of Highway 140, the Yosemite All Year Highway in sections 2 and 3, T. 7 S., R. 16 E. and sec. 35, T. 6 S., R. 16 E., M.D. These quarries are less than 2 miles from the intersection of the highway with the Mariposa-Merced County line and 7 miles from the railroad at Planada.

The only slate property that has produced flagstone in recent years is in sec. 21, T. 5 S., R. 18 E., M.D., at the north end of Nigger Hill close to Agua Fria Creek and Highway 140 approximately 9 miles by road from Cathay. There has been a small intermittent production of flagstone from this place sold locally and called for by the customer. Formerly part of Las Mariposas Grant the property is now separately owned.

Talc, Pyrophyllite and Soapstone

Talc occurs at numerous places in Mariposa County as a hydrothermal alteration product of serpentine. It is found in and adjacent to many of the quartz veins that cut serpentine but is also found along shear zones in serpentine not associated with quartz veins. Because most of the talc formed by alteration of serpentine contains considerable iron it cannot be used for most ceramic purposes, and its usefulness is limited to such products as lubricants, insecticides and, when sufficiently pure and white, cosmetics. Up to the present deposits that are larger and nearer the marketing centers have supplied most of the requirements of the California market in talc of the lower grades, but some of the Mariposa County occurrences may be used in the future. There has been no systematic exploration or testing of any of the Mariposa County deposits to determine the extent and quality of the material available. Most of the occurrences discovered thus far in the county are in the Flyaway Gulch vicinity of the Bagby district.

Talc rock or soapstone was used all along the Mother Lode in the early days for building facings as it looked good and was easy to shape. Talc for this purpose was produced in the hills east of Mariposa and on Greeley Hill east of Coulterville.

Pyrophyllite in beautifully crystallized rosettes occurs with quartz on Three Buttes (Tres Cerritos) 2 miles southwest of Indian Gulch. It has developed by hydrothermal alteration of greenstone of the Upper Jurassic Amador group along a northwest-trending shear zone. The pyrophyllite is too intimately mixed with quartz to allow selective mining and the total pyrophyllite content of the quartz mass is low. Presence of iron oxide from altering pyrite also detracts from the economic value of the deposit. The pyrophyllite-bearing zone is at least half a mile long and 20 to 40 feet wide.

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TABULATION OF MARIPOSA COUNTY MINERAL DEPOSITS

The following table lists Mariposa County mineral deposits in alphabetical order by commodity. The number in the first column refers to the location on the county map, plate 4, in pocket.

The references given in the *Remarks* column refer to the bibliography accompanying this report. Only the last name of the author is given. The first number following the author's name is the abbreviated date of publication as given in the bibliography; the second number, that following the colon, is the page reference.

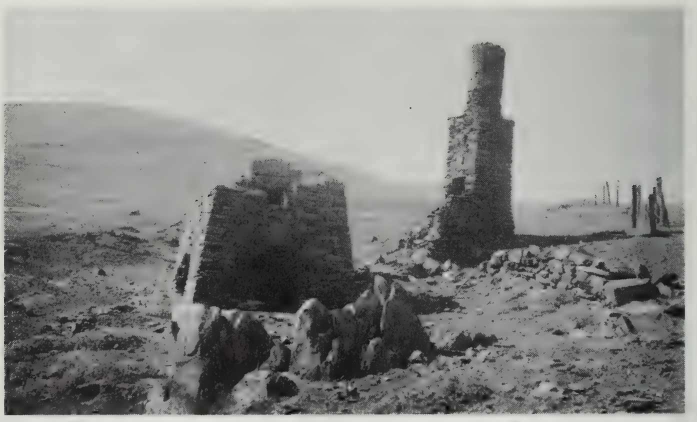

FIGURE 62. Ruins of one of the first copper smelters built in California. In the Green Mountain district near the Raymond Mariposa road. *Photo by W. O. Castello, October 1919.*

CHROMIUM

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
1	Fossow property	Oro Rico Mines Co., c/o A. D. Vencile, Rm. 14, 1584 Washington Boulevard, Los Angeles	NE$\frac{1}{4}$ 29	2S	16E	MD	Near Penon Blanco, 3 miles northwest of Coulterville (Cater 48:14; herein).
	Purcell-Griffin						See Riverside chrome.
2	Reed property	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	SW$\frac{1}{4}$ 27	2S	16E	MD	On Blacks Creek 1 mile southeast of Fossow property (Cater 48:14; herein).
	Riverside chrome (Purcell-Griffin)	Alfred W.Stickney 435 Hillcrest Road, San Mateo	NE$\frac{1}{4}$ 22	3S	16E	MD	Southeast of Coulterville 3$\frac{1}{2}$ miles (Cater 48:14; herein).

COPPER

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
3	A. C. Smith		3	7S	17E	MD	Discovered about 1883. Intermittent production 1893-1908. Adjoins Great Northern and has similar geology. Had a shaft 80 feet deep in 1908. One shipment of ore was reported to run 15 percent copper (Aubury 08:262). One mile west of Pocahontas mine.
	Amador						See Green Mountain group.
	American						See Green Mountain group.
	American Eagle						See under zinc.
4	Barrett (Baretta, Berette, Barrette, Beaudry, New Year, Wildcat)	Angelo Beaudry and Inez Bouvier, 1431 Moraga Street, San Francisco	29 30 32	3S	16E	MD	Hunter Valley district (Aubury 05:215; Lang 07:966; Aubury 08:267; Castello 21:107; Eric 48:265; herein). Includes New Year, Wildcat, and Mountaineer patented claims, and Berettes Enclosure, a patented property which includes the old Berette and Beaudry claims.
	Barretta						See Barrett.
	Barrette						See Barrett.
5	Beaudry						See Barrett.
	Berette						See Barrett.
	Bouvier						See Carson under Gold.
	Bruschi	Not determined	SE$\frac{1}{4}$ 30?	3S	16E	MD	Workings in 1902 consisted of several shafts, cuts and tunnels. Located northwest of Castagnetto II mine. (Aubury 05:215).
	Buena Vista						See Green Mountain group.

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Carson						See under Gold.
6	Castagnetto II	Not determined	SW¼ 30	3S	16E	MD	A quarter of a mile northwest of New Year claim of the Barrett mine in the Hunter Valley district 10½ airline miles north of Hornitos. Geology and occurrence of ore similar to Barrett mine. Ore contains both gold and copper. Best copper ore was in the oxidized zone and was carbonate type (Aubury 05:215; 08:267).
	Cavan						See Good View.
	Cavan - San Jose						See Good View.
7	Chemisal (Castagnetto III)	Not determined	NE¼ 31	3S	16E	MD	Close to Last Chance gold mine and Barrett copper mine. Ore contains both gold and copper, best copper ore oxidized. In 1902 there were two shallow shafts 15 and 20 feet deep, respectively (Aubury 05:213).
	Copper Chief						See Green Mountain group.
	Copper Hill	Not determined	14	6S	16E	MD	Patented mine with shaft 60 feet deep according to Wilkinson 04:15.
	Copper King I						See White Rock.
	Copper King II						See Green Mountain group.
	Copper Mountain						See Green Mountain group.
	Copper Peak						See Green Mountain group.
	Copper Queen I	Not determined	19	5S	19E	MD	Produced a small amount of gold in 1890 and 5750 pounds of copper in 1912; also a small amount of gold and silver, according to Housemann (in Aubury 08:268). The

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Copper Queen I (continued)						vein strikes northwest between schist walls. Upper part of vein is carbonate ore with native copper, and lower part is blue sulfide. Width of vein, 4 feet. Workings in 1908 consisted of a shaft 40 feet deep and another incline 15 feet deep. (Aubury 05:216; 08:268; Laizure 28:125.)
	Copper Queen II						See Green Mountain group.
	Cornett	Not determined	30	6S	17E	MD	Cathay district. Wall rocks schistose greenstone. Vein is 34 inches wide. Near granodiorite contact. Sulfide ore; 160 sacks yielded 20 percent copper, $2.26 to $4.60 in gold per ton. (Aubury 08:264; Eric 48:266.)
	Crown Point						See Good View
	Discovery						See Green Mountain group.
	Ferrari	Not determined	30	3S	16E	MD	Near Castagnetto mine. In 1902 had shaft 50 feet deep and several open cuts; $5000 pocket of gold found in mine about 1902. Copper ore reported by Aubury 05:215 to be of fair grade.
							See Green Mountain group.
8	Good View (Cavan-San Jose)	Mine-Metal Properties, Inc. c/o C. C. Kellogg, 50 - 26th Street, Merced	4,5 8,9 32	8S 7S	18E 18E	MD MD	Patented. 161.3 acres; 3 miles west of Green Mountain School (Aubury 05:206-209; 08:257; Lowell 16:573; Castello 21:103; Laizure 28:77; herein). Property includes Rothschild. Sunset, S.A., Crown Point, Little Giant, San Jose, Stonewall Jackson, and Copper King claims. Property fromerly called Cavan and Cavan-San Jose mine.

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
9	Great Northern	Not determined	2,3 10 11	7S	17E	MD	Vein 1 to 8 feet in schistose greenstone. Workings once included three shafts 25, 70 and 110 feet deep, and 40 feet of crosscuts from deepest shaft. Ores consist of chalcopyrite, pyrite, bornite, and green carbonates. (Aubury 05:209; Lang 07:1010; Aubury 08:260; Laizure 28:77). One mile west of Pocahontas.
	Green						See Johnnie Green.
10	Green Mountain group	Dr. Felix A. Smith, 507 Medical Bldg., Oakland 12	3 10	8S	18E	MD	Not patented, (Aubury 05:206; Eng. and Min. Jour. 07, vol. 84, p. 964; herein), includes Amador, Copper Chief, Copper King, Copper Mountain, Copper Peak, Discovery, Francisco, Green Mountain, Juliet and Last Chance claims. Once included the Lone Tree, Hecla, Ironclad, Verde, Iron Mask, Calumet, Monte, Nevada, Montana, American, Copper Mount, and Copper Queen claims. Some of these were later renamed and some have passed into different ownership. (Laizure 28:77,125).
	Heiser	Not determined	19	5S	19E	MD	Located 3 miles east of Mariposa; adjoins Copper Queen I mine. About 1908 had a shaft 30 feet deep. Ore reported to run 19 to 37 percent copper. (Aubury 08:268.)
11	Indian Peak group	Not determined	19 20	6S	20E	MD	Indian Peak claim located about 1897; others in 1913. Carbonate and sulfide ores in limestone gangue. Wall rocks limestone and granodiorite. In 1914 workings consisted of two inclined shafts each 35 feet deep, both sunk in ore; also four tunnels 120, 20, 50 and 20 feet long respectively. (Lowell 16: 574.)
	John Diaz						See Owl Copper.

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
12	Johnnie Green (Green, Johnny Green Jr.)	Not determined	31	7S	18E	MD	(Lang 07:964; Eric 48:267; herein.)
	Johnny Green						See Johnnie Green.
	Johnny Green Jr.						See Johnnie Green.
	Juliet						See Green Mountain group.
13	Klondike and Last Chance	Not determined. Probably Joe A. Marino ($\frac{1}{2}$), Rt. 2, Box 239, Merced; and John V. Johnson ($\frac{1}{2}$), Hornitos	NW$\frac{1}{4}$ 16 NE$\frac{1}{4}$ 17	7S 7S	18E 18E	MD MD	Small production of relatively low-grade ore in 1912-13 by R. S.Calhoun of Lewis, California (Eric 48:268). Ore contains some gold.
14	La Victoria (La Victoire, Victoire, Tandem)	Ralph E. and Libbie N. Dailey, 1165 West 22d Street, Merced	4,9 10	4S	16E	MD	(Browne 68:207-219; Aubury 05:213; Lang 07:1010; Aubury 08:265; Castello 20:103-104; Laizure 28:79; Julihn and Horton 40:167-168; Cox and Wyant 48:127-132; herein) 10 acres, patented.
	Last Chance						See Green Mountain group.
	Little Giant						See Good View.
15	Lone Tree	Not determined	4 33	8S 7S	18E 18E	MD MD	Produced 12,451 pounds of copper in 1905. Well-defined mineralized shear-zone strikes N. 30° - 40° W., 300 feet wide. Within this zone are two well-defined veins between which the wall rocks are more or less mineralized. Mine produced carbonate ore to depth of 150 feet; chiefly sulfides below that level. In 1908 there were several shafts between 25 and 100 feet deep and a main

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lone Tree (continued)						shaft 200 feet deep with drifts and stopes on the 150-foot level. (Aubury 08:257; Laizure 28:77.) Operated as part of the Green Mountain mine in early 1900's.
	Lookout	Not determined	NE$\frac{1}{4}$ SE$\frac{1}{4}$ 32	7S	18E	MD	A mile and a quarter northwest of Green Mountain Forest Service Lookout. Oxidized copper ore, chiefly malachite, occurs in a northeast-trending shear zone in phyllite and amphibolite schist of Upper Jurassic age. Wall rocks adjacent to the shear zone are porous and thoroughly leached by hydrothermal solutions. Workings consist of two old shafts 60 feet and 30 feet deep, respectively,and numerous shallow shafts and cuts. The most recent working is a shallow shaft inclined 80° E. supported by 8-inch stalls and entered by a chain ladder. It is equipped with a lightweight hoist. Exploration work was being carried on intermittently in the summer of 1956.
16	Mammoth group	Not determined	8,9	8S	18E	MD	Adjoins Good View claims on south. Property originally consisted of 14 claims. Three steeply dipping, northwest-trending veins within a zone 600 feet wide. In 1908 the east vein had a shaft 80 feet deep, the middle vein had shafts 20 and 25 feet deep, and the west vein one shaft 50 feet deep; west shaft exposed 3 feet of copper ore containing some gold. Some sulfide ore shipped ran 20-22 percent copper (Aubury 08:260). Country rocks in this vicinity are slate and chiastolite-mica schist.
	Mormon Bar group	Not determined	30	5S	19E	MD	In vicinity of Mariposa district fair grounds; copper showing in quartz porphyry country rock (Lowell 16:574).
	Mountaineer						See Barrett.

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	New Year						See Barrett.
	Owl Copper (John Diaz)	Joe C. Souza and Tony Diaz, 542 R Street, Merced	12	6S	16E	MD	Vein 3 feet wide strikes northwest; schistose greenstone walls. Ore minerals include cuprite, azurite, chalcopyrite, and chrysocolla; had shaft 24 feet deep in 1902 (Aubury 05:213; 08:265).
17	Pocahontas	Estate of Eben N. Briggs, c/o L. M. Olds, Room 402, 57 Post Street, San Francisco	1,12 14	7S	17E	MD	Most productive copper mine in Mariposa County. (Aubury 05:209-210; Lang 07:1010; Aubury 08:260-262; Forstner 08:747; Lowell 16:573; Castello 20:103; Julihn and Horton 40:166; herein).
	Rihn Ranch	Not determined	13	3S	15E	MD	Two shafts 60 and 40 feet deep expose chalcopyrite and oxidized copper ore (Aubury 05:215).
	Robinson	Georgia Robinson, address not determined	N½ 21	6S	18E	MD	On the north bank of Mariposa Creek about 100 yards west of the White Rock fire-control road. Quartz vein in schist. Ore is chiefly chalcopyrite and pyrite in quartz and although the precious metal content is promising the copper content makes the ore unacceptable at some smelters. Main working is a shaft with several short laterals. Worked intermittently by lessees.
	Rothschild						See Good View.
	San Jose						See Good View.
	Stonewall Jackson						See Good View.
	Sunset						See Good View.
	Tandem						See La Victoria.

COPPER (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
18	Toad	Not determined	31	7S	18E	MD	Small masses of high-grade sulfide ore occur in schist. Main shaft was down 200 feet in March 1904. One carload of ore was shipped early in 1904. (Eng. and Min. Jour. 04, vol. 77, no. 9 p. 375; 04, vol. 77, no. 11, p. 575; Lang 07:964; Eric 48:269).
	Victoire						See La Victoria.
19	Ward	Not determined	34	6S	19E	MD	Adjoins Indian Peak group and geology is similar; ores contain some native copper.
	White Knob						See White Rock.
20	White Rock (Copper King, White Knob)	James Helm Le Grande (1943)	NW¼ 14	7S	17E	MD	A quarter of a mile south of White Rock silica mine. Discovered in 1900. Ore occurs in a shear zone in schist, mineralized rock being 25 or more feet wide. Oxide and carbonate ore reaches a depth of 100 feet, sulfides below that depth. In 1908 the principal working was a 150-foot shaft from which 175 feet of drifts had been driven; also numerous minor workings. Several carloads of ore were shipped 1900-02 that yielded 35 percent copper; one carload ran 40 percent copper. Oxidized ore reported to carry $1.50 to $2.50 in gold per ton at the old price of gold, and 3½ ounces of silver. Produced 17,000 pounds of copper in 1916. (Aubury 05:210-212; 08:262-264; Reid 08:49; Laizure 28:211; Julihn and Horton 40:211; Eric 48:270.) Reported to be a patented mine (Eric 48:270) but was not on County Assessor's list in 1954.
	Wild Cat						See Barrett.

LODE GOLD

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
21	A-J (Burkhart)	B. F. and Ruth L. Burkhart, Bear Valley (1954)	26	4S	16E	MD	Located $3\frac{1}{2}$ airline miles west of Bear Valley. Discussed herein.
22	Adelaide and Anderson	Alfred W. Stickney, 435 Hillcrest Road, San Mateo	NE$\frac{1}{4}$ 22 NW$\frac{1}{4}$ 23	3S	16E	MD	Four miles south of Coulterville and 1 mile north of Merced River in Horseshoe Bend Mtns. (Fairbanks 90:57; Storms 95:217; Eng. and Min. Jour. 05, vol. 79, p. 1292, 1910; Lowell 16:575; Laizure 20:104; herein.)
	Aden						See Menlo Consolidated.
23	Agua Fria Canyon	Not determined	NW$\frac{1}{4}$ 20	5S	18E	MD	Four-inch vein on west side of canyon half a mile north of confluence of Carson Creek. Two small lots of ore mined in 1900 and 1908 totaled 12.65 tons and yielded \$131.07 or \$10.37 per ton. (Logan 35: chart facing p. 188.)
	Akoz (B.A.B. Radium, Asposozien)	Carlin estate, c/o Mrs. P. Erickson, La Grange	9,10	4S	18E	MD	See under zinc. Small gold production 1941 and 1944-47.
	Alabama						See Whitlock group.
	Aladdin	Not determined. Under lease to H. H. Odgers	NW$\frac{1}{4}$ 30	4S	18E	MD	In the Whitlock Creek district. Adjoins the Nutmeg mine on the northwest. Property being developed by H. H. Odgers (1956).
	Alarid prospect	Frank Casaccia, Mariposa	8	5S	18E	MD	Located $2\frac{1}{2}$ miles northwest of Mariposa. Quartz vein about $2\frac{1}{2}$ feet wide strikes east and dips 60° S. Small tonnage of ore taken out in 1917-18 that averaged \$15.00 per ton at the prevailing price of gold. At that time workings consisted of a shaft 20 feet deep and a drift 100 feet long.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Albert Austin group						See Banner group.
24	Alice (Alice Quartz I)	Horace Meyer, Mariposa	NW¼ 16 NW¼ 17	5S 5S	17E 17E	MD MD	Located 4½ miles west of Mt. Bullion just south of the Mt. Bullion-Hornitos road and about 1200 feet east of the Long Mary mine. Equipped (Sept. 1954) with a wooden headframe but no hoisting or milling machinery. Property consists of two claims located in the 1850's. Early history not recorded. Active in 1901, 1902, 1903, 1906, and 1908, producing 1284 tons of ore which yielded $13,500 or about $10.51 per ton at old price of gold. Mined for a short time in 1936 producing 268 tons of ore which yielded approximately $7.54 per ton at present price of gold. Quartz vein averages about 3 feet wide, strikes northwest and is nearly vertical. Slate wall rocks. In 1914, workings consisted of a 200-foot shaft, three levels with 360 feet of drifts, one 27-foot winze and a 38-foot raise. Some additional work was done in 1936 (Lowell 16:575; Castello 20:105; Logan 35:188).
	Alice Quartz II	Chris Mills, ℅ Bagby Store, Coulterville	36	3S	16E	MD	Adjoins claims of the Red Bank mine 2½ miles northwest of Bagby. Pocket mine in greenstone. Small production during last 3 years. Worked intermittently.
25	Alta	Lena Giusto, Box 66, Angeles Camp	19	3S	17E	MD	Located 6 miles southeast of Coulterville near head of Flyaway Gulch. Part of the Flyaway group of mines. Lies between Talc and Silver Right claims. Property consists of 15.25 acres. A pocket mine with small intermittent production. Quartz vein in greenstone and serpentine walls strikes northwest and dips steeply northeast. Superficial workings. Idle.
	Alvina						See Quail.
	Amelia						See Ruth Pierce.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	American Eagle						See under Zinc.
	Anderson I						See Clearinghouse.
	Anderson II		NE¼ 22	3S	16E	MD	See Adelaide and Anderson.
	Anderson and Aul						See Aul and Anderson.
26	Anita	Not determined	6,7	2S	16E	MD	On Willow Creek close to State Highway 132. Quartz vein in greenstone wall rocks.
	Ann	Not determined	22	7S	17E	MD	White rock district near Ganns Creek. Produced a small tonnage of low-grade ore in 1927.
27	Annabelle prospect	Mr. and Mrs. Sherman S. Pickard and Bryan A. Miller, Coulterville	NW¼ 19	3S	17E	MD	Located 50 feet north of Highway 49 and 50 feet northwest of Scotch Gulch, 4 airline miles southeast of Coulterville. Unpatented claim owned and operated by Pickard and Miller (discussed herein).
	Apolinaris	Not determined	22	5S	18E	MD	Former Mariposa Grant mine. Land has reverted to agricultural status. Last worked in 1908 when 9 tons of ore were mined which yielded $126.29 or an average of $14.05 per ton at the old price of gold. (Logan 35:188.)
	Apollo	Not determined	13	5S	17E	MD	One of Las Mariposas Grant mines. Land has reverted to agricultural status. Near Princeton mine. Active 1936-38 producing 99 tons of ore which yielded an average of 32.89 oz. of gold and 8 oz. of silver, an average of $11.70 per ton (Logan 35:188).
	Arcturas (B.V.D.)	Not determined	30	6S	18E	MD	In the Guadeloupe Mountains 4 airline miles southeast of Cathay School. Small tonnage of low-grade ore was

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Arcturas (B.V.D.) (continued)						produced in 1908 (U.S. Bur. of Mines records). Principal development work 1921-23 by B.V.D. Mining Co. which had six unpatented claims, the Rich-Luckett, Arcturas, Day Break, Moore Hill, Arcturas No. 9, and Arcturas No. 7. Northwest-trending northeast-dipping vein up to 9 feet wide cuts granodiorite. Ore is high in sulfides. Mine is half a mile southwest of the Rich mine and west of the Francis mine. Idle (Boalich 22:364; Laizure 28:82).
28	Argo (Pioneer)	Walter D. McLean, Coulterville	NW¼ 15 NE¼ 16	2S 2S	17E 17E	MD MD	Located 7 airline miles northeast of Coulterville in the Greeley Hill district. Two claims (Eng. and Min. Jour. 31, vol. 132, no. 2, p. 84; Julihn and Horton 40:135; herein).
	Argonaut						See Quartzburg group.
	Arkansas Flat	Not determined	21	5S	18E	MD	Located two miles west of Mariposa on a ridge between Carson Creek and McBrides Gulch. Pocket mine in slate and greenstone (?). Active 1906-08 and 1911. In that period 8.75 tons of ore were milled that yielded $953.91 or an average of $109.02 per ton. A Las Mariposas Grant mine. Has reverted to agricultural land status (Logan 35:188).
	Arkell group						See Hite.
29	Artru (Dorothy)	C. W. and Velma Worley, Mariposa	NW¼ 27	4S	18E	MD	Patented property consisting of 6.45 acres in the Colorado district near the junction of Long Canyon and Saxon Creek, 5 airline miles north of Mariposa. Worked by H. Artru for a 15-year period ending in 1912. No material amount of work done since that time. Pockets of high-grade ore, including crystallized gold, occur in an altered porphyry dike cutting slate (Lowell 16:576).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Artru (Dorothy) (continued)						Dike strikes roughly NW and dips 70° SW (Castello 20:106). In 1914, workings consisted of a 75-foot shaft, 450 feet of drifts, four crosscut tunnels, each about 140 feet long, and several raises (Lowell 16:576).
	Aul and Anderson	Not determined	30	5S	18E	MD	Close to Highway 140, 5 miles west of Mariposa in the vicinity of the Sorrel (Sarle), Turner, and Ortega mines. Vein system strikes N. 10° W. to N. 20° W., approximately vertical. Wall rocks are granodiorite, granodiorite porphyry and aplite. During 1900, a return of $76.74 came from 4.18 tons of ore for an average of $18.35 per ton (Logan 35:188).
	Austin group						See Golden Key.
30	B and M (Fournier)	Not determined	3	6S	18E	MD	On Buckeye Creek 4 airline miles south of Mariposa or 2 miles SW of Mormon Bar. Last known period of activity was 1934-39 when 55 tons of ore were shipped which yielded $5000.00 in gold and silver. May be the same property from which 8.5 tons of pocket ore yielded $7523.04 between 1911 and 1914 (Logan 35:188). Two approximately parallel veins strike N. 55° W. and dip southwest. Wall rocks are biotite hornblende quartz diorite. East vein has an apparent dip at the surface of about 70°. It is equipped with a vertical shaft between 65 and 110 feet deep (largely filled with debris) with a northwest drift about 50 feet long. West shaft was originally 110 feet deep with 185 feet of drifts (Laizure 35:28). Ore carries only 3 percent of sulfides. Average milling ran $25.00 to $30.00 per ton with high-grade running as high as $643.00 per ton.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
31	Badger (Prescott)	Mrs. Charles B. Cavagnaro, Hornitos	2	5S	16E	MD	In the Quartzburg district about $3\frac{1}{2}$ airline miles northeast of Hornitos. Adjoins the Number 5 mine on the north (Laizure 28:80; 35:29; herein).
	Baker prospect	Not determined	18	5S	18E	MD	Located 2000 feet southwest of Princeton vein and mine. Produced 18 tons of ore in 1912 from which $248.24 was realized or an average of $13.81 per ton (Logan 35:188). Northwest-trending vein, slate walls.
32	Balance	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	NE$\frac{1}{4}$ 3	3S	16E	MD	On east branch of Mother Lode half a mile south of Coulterville. Patented property consisting of 2.34 acres. Adjoins Louisa claim on south and Venture claim on north. Quartz-mariposite-ankerite vein strikes N. 45° W. and dips 50° NE. Ore minerals are free gold, auriferous pyrite, and galena. Slate and greenstone wallrock. Production and extent of former workings not recorded. Idle for more than 50 years. See Mary Harrison group.
	Bald Eagle						See Sultana group.
	Bandaretta						See Bandarita.
33	Bandarita (Bandaretta, Eclipse)		NW$\frac{1}{2}$ 7	3S	18E	MD	On the North Fork of the Merced River at its confluence with Gentry Gulch. (Storms 94:167; 96:216; Laizure 28:89; Julihn and Horton 40:141; herein.)
	Bank of California	Not determined	27	4S	18E	MD	Mine not identifiable from available descriptions. Could be one of two workings in E$\frac{1}{2}$ sec. 27. Probably one of mines later gathered together under the name Mountain Belle group. Owner (1914) G. E. Dunbar of Kalamazoo, Michigan. Quartz vein in porphyry dike cutting slate. Workings once consisted of a 50-foot and a 75-foot shaft, both caved. (Lowell 16:576.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
34	Banner group (Albert Austin group, London)	Not determined	NE¼ 31 SE¼ 30	4S	18E	MD	Several claims lying between the Geary and Nutmeg mines 4 miles northwest of Mariposa via the Whitlock Creek road. Principal vein strikes N. 20° W., dips nearly vertically, and from the disposition of the workings it appears that there were several cutter veins. Schistose greenstone wall rocks. Main shaft, vertical, is partly caved and a line of caved stopes extends north of the shaft for several hundred feet. Several east-trending open cuts apparently are sunk on cutter veins.
	Barfield						See Mt. Gaines.
	Barley Field						See Landrum.
	Barney Kane (Kane Quartz, Mayflower)	Not determined	2	5S	19E	MD	East slope of Buckingham Mountain 8 airline miles northeast of Mariposa and 1 mine northwest of Buckingham Mountain School. Owned in 1927 by C. N. Kane, Mariposa; in 1932 by Mrs. Barney Kane of Merced and Roy Green, Usona. Quartz vein about 4 feet wide strikes northeast and dips 55° southeast in granitic wall rocks. Vein reputed to sample 1.31 oz. of gold. Ore is native gold in quartz. Workings consist of two tunnels 60 feet and 140 feet long, a 35-foot vertical shaft, and a connecting 18-foot drift (Laizure 28:119; 35:29).
	Barrel Springs	Not determined; probably Horace Meyer, Cathay	SE¼ 23	5S	17E	MD	Last active in 1905 when 47½ tons of ore yielded $708.68 or an average of $14.89 per ton (Logan 35:188). Land has probably reverted to agricultural status. One of the mines of Las Mariposas grant.
	Bart						See Black Bart group.
	B. B.						See Bogan and Baitelle.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
35	Bean Creek (Epperson) group (Kohler, Walsh, Caroline, and Blowout claims)	Mrs. Gladys Schutte, Coulterville	21,28	2S	17E	MD	Patented property consisting of 66.6 acres on Bean Creek 2 airline miles east of Greeley Hill School. Vein system strikes N. 85° W. with an average dip of 65° N. Wall rocks are slate, schist, and hornfels of the Paleozoic Calaveras group. Idle.
	Bear Creek						See Malone.
	Bearfield						See Mount Gaines.
	Belces	Not determined	19	3S	17E	MD	Mariposa County Register of Mines for 1903 indicates that mine is close to the Buckhorn Peak road (southwest side) at the extreme eastern edge of the section. Same source lists the vein as 3 to 5 feet wide with a northeast strike and 45° SE dip. Ore reported to contain native gold and auriferous pyrite. Workings in 1903 reported to consist of a 55-foot inclined shaft and a 50-foot open cut. (Wilkinson 04:10.) Land has probably reverted to agricultural status.
36	Big Break, Big Break Ext. No. 1, Contact lode	Bryan A. Miller, Box 36, Coulterville (1954)	14	3S	16E	MD	Coulterville district, about 2½ airline miles southeast of Coulterville; adjoins Virginia mine on the northwest. Three unpatented contiguous claims. Country rock is greenstone, slate, and serpentine cut by basic dikes. Quartz vein strikes northwest and dips northeast, developed by 40-foot shaft with some connecting drifts. Development work is done intermittently; no recorded production.
	Big Buck						See Yellow-Metal group.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
37	Big Lode	(2/3) James K. and Bernard Lindsey, 5301 Harter Lane, La Canada (12 acres) (1/3) John Lindsey, Coulterville (6 acres)	29,30	3S	17E	MD	Located 7 miles southeast of Coulterville near head of Flyaway Gulch. One of the Flyaway group of mines discovered prior to the 1890's. Vein occurs along a series of multiple dikes of albitite, norite, and diorite. The dike series divides serpentine from sheared greenstone. Vein-dike series strikes N. 50° W. and dips 55-60° NE. In addition to pockets of gold which occur in both albitite and quartz there are masses of mineralized serpentine which contain some gold. During 1913, 117 tons of ore mined by G. A. Helander of Coulterville yielded 68.02 oz. of gold and 13 oz. of silver. Shaft and adjacent workings inaccessible in September 1954. Idle.
	Big Oak	Not determined	NE$\frac{1}{4}$ 4	5S	17E	MD	Las Mariposas Grant mine active 1902, 1904, 1906 and 1909. During this period 98.78 tons of ore was mined which yielded $1564.71 or an average of $15.85 per ton. (Logan 35:188.)
	Billings						See Granite King.
	Bill Jones						See Number Nine.
	Bill Jones and McCall						See Number Nine.
38	Black I	Robert Gemblin, Coulterville	12	3S	17E	MD	Quartz vein in slate probably on same vein system as Sunshine claims. No recorded production. Had a shaft 170 feet deep in 1868. Wall rocks described as limestone and yellow slate. Vein strikes west and dips south, according to Browne (68:31).
	Black II						See Confidence.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
39	Black Bart group (Cal-Penn-Tex group, Bart)	Franz E. Ryburg, Coulterville	27	3S	17E	MD	East side of Solomon Gulch above junction with Black Bart Gulch, 11 miles southeast of Coulterville or 3 miles southeast of Buckhorn Peak via Highway 49 and the Buckhorn Peak road. Property consists of three unpatented claims, the Black Bart, Worms Turn, and Cal-Penn-Tex. The ground surface in the vicinity has been placered. Ore occurs in a quartz vein which parallels and in places is interlaminated with a light-gray albitite dike. The dike-vein system strikes N. 65° W. and dips 25-30° NE. Gold also occurs in rust-colored hydrothermal alteration pockets in albitite associated with chlorite (Storms 94:169).
	Black Cat	Etta Barnard and S. W. Wilmert, Hornitos	21	4S	16E	MD	Hornitos district, $2\frac{1}{2}$ airline miles north of Quartzburg School and half a mile north of the Silver Lead mine. Occurrence similar to Silver Lead mine. Undergoing development work 1953-55.
40	Black Hill (Pumpkin)	Louise A. Boyd, 265 California Street San Francisco 11	33	2S	16E	MD	Adjoins Margaret claim on the north, 1/2 mile northwest of Coulterville. Patented property consisting of 40 acres. (Storms 96:218; 00:147; Eng. and Min. Jour. 00: vol. 76, p. 167, 647; herein.)
	Black Jack	Not determined	1	3S	16E	MD	Quartz vein in greenstone wall rocks. Produced 406.35 oz. gold in 1900-01 from an unknown tonnage of ore, and 1043.35 oz. gold and 14 oz. silver in 1909-10, also from an unknown tonnage of ore(U.S. Bur. Mines records).
	Black Log	Not determined; probably Catherine B. Trabucco and Elsie R. Dovidio, Midpines	13	4S	18E	MD	Close to Buffalo or San Domingo mine. Quartz vein 6 inches to 1 foot wide in prophyry wall rocks. Chief working in 1914 was a shaft 70 feet deep. Working caved and inaccessible in August 1954 (Lowell 16:576).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Black Oak	Not determined	8	5S	20E	MD	Three miles east of Darrah. Last period of activity was 1933-36 during which time 153 tons of ore was milled which yielded 144.33 oz. of gold, 37 oz. of silver and 1507 pounds of copper (U.S. Bur. Mines records).
41	Black Spider (Gray Eagle, Blue Jay)	Walter McLean, Coulterville	19	3S	17E	MD	Located 6 miles southeast of Coulterville. Adjoins Flyaway group of mines on northwest. Quartz vein strikes N. 60° W. and dips 50° NE. Vein is at contact of greenstone on northeast and serpentine on southwest. Gold occurs in pockets and in sulfide-impregnated serpentine. Workings consist of several tunnels driven N. 40° E. and several caved shafts. Worked intermittently by hand methods. During 1935, about 480 tons of ore yielded 85.48 oz. of gold. In 1914 workings consisted of a 133-foot inclined shaft, 355 feet of drifts, a 300-foot crosscut tunnel and two stopes (Lowell 16:582; Castello 20:117; Laizure 28:89).
	Black Spring	Not determined	18	5S	18E	MD	Upper Agua Fria Creek near Mt. Bullion. One of Las Mariposas Grant mines. Active in 1905, 1906, and 1909. During this period 56.82 tons of ore yielded $620.90 or an average of $11.09 per ton at the prevailing price of gold. (Logan 35:188).
	Blowout						See Bean Creek group.
	Blue Bell (Jumbo)	Not determined; probably Hiram Branson, Midpines	9	4S	20E	MD	On the north slope of the Chowchilla Mountains close to the south Fork of the Merced River 6 miles northeast of Jerseydale. Northwest-striking vein having an average width of 5 feet dips 72° northeast. Porphyry footwall and slate and granite hanging wall. Workings in 1941 consisted of a 145-foot crosscut tunnel and 80 feet of drifts. Property consists of three unpatented claims, the Blue Bell, Jumbo, and Blue Bell extension.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Blue Bell (Jumbo) (continued)						(Lowell 16:577; Castello 20:107; Laizure 28:80.)
	Blue Jay						See Black Spider.
	Blue Lead						See Garibaldi.
	Boarding House Vein	Not determined	18	5S	18E	MD	Las Mariposas Grant mine. Active 1902-03 producing 133.69 tons of ore yielding $2060.30 or an average of $15.43 per ton (Logan 35:188).
42	Bob McKee (McKee)	Not determined	SE¼ 20	2S	18E	MD	Located 5 airline miles northeast of Coulterville or 1½ miles east of Greeley School. Quartz vein 1 to 3 feet wide strikes N. 20° E. and dips 65° NW. Wall rocks are slate and hornfels. Vein matter consists of milky quartz with pyrite and wall rock inclusions. Workings consist of two shafts, both caved, and a series of open cuts along the vein which may represent caved stopes. Idle in August 1954. Mine unequipped.
43	Bogan and Baitelle (B. B.)	John Wildt, Midpines	W½ 26	4S	18E	MD	Patented property consisting of 5.15 acres in the Colorado district 1 mile east and slightly south of Colorado School. Quartz vein 2½ feet wide (average) strikes northwest and dips steeply northeast. Wall rocks are metasediments of the Paleozoic Calaveras group. In 1914 mine consisted of four adit levels, respectively 60, 100, 250, and 300 feet long. Some specimen ore was produced from pockets. In 1924, fifty tons of ore yielded 47.76 oz. of gold and 1 oz. of silver (U.S. Bur. Mines records). A small tonnage (26) mined in 1937-39 yielded 5 oz. of gold. (Lowell 16:577; Castello 20:107; Laizure 28:81.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
44	Bonanza I	Lena Giusto Box 66, Angels Camp	29	3S	17E	MD	Located 7 miles southeast of Coulterville. One of Flyaway group of patented claims. Quartz vein in greenstone wall rocks strikes roughly N. 70° W. and dips steeply north. Claim largely undeveloped. Adjoins Southern Cross claim on west and Sweetwater drain on east.
	Bonanza II						See Spread Eagle group.
	Bonanza III						See Quail.
45	Bondurant (Hathaway-Bondurant)	A. E. Adams, et al., 368 Maude Avenue, San Leandro	25	2S	17E	MD	A patented property consisting of 8 acres near the North Fork of the Merced River 12 miles east of Coulterville (Goodyear 88:347; Storms 96:216,225; Lowell 16:577; Castello 20:108; Laizure 24:81,124;35:46; herein). Adjoins the Louisiana mine on the east.
	Booth	Not determined	5	5S	20E	MD	Located 2 miles east of Darrah on Footman Ridge. Quartz vein a few inches to 18 inches wide strikes northwest and dips about 45° NE. Granitic wall rocks. In 1914 there were two shafts 28 and 95 feet deep and a tunnel 120 feet long (Lowell 16:577).
46	Boston	Walter Lautenschlager, 626 South Catalina Street, Los Angeles 5	32,33	2S	16E	MD	Property consists of one patented claim in Mahoney Gulch $1\frac{1}{2}$ miles northwest of Coulterville and three-quarters of a mile north of State Highway 132. There is no record of production from this mine and there are no visible workings. Probably located because veins penetrate the claim at depth.
	Boulder						See Permit.
	Bouvier						See Carson.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bower Cave						See Horseshoe I mine.
	Bowman	Not determined	26	4S	18E	MD	Mine not distinguishable in field by available description. Reputed to be a pocket mine. Claim embraced several shafts and prospect holes in 1914 (Lowell 16: 577).
47	Bozeman	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles	N$\frac{1}{2}$ SE$\frac{1}{4}$ 4	3S	16E	MD	Property consists of 1 patented claim located parallel to and about 2000 feet east of the Malvina claim half a mile southwest of Coulterville. There is no record of activity or production from this mine and there are no visible workings. Veins may have been encountered at depth in process of working the adjoining Malvina mine.
	Brooks						See Doss.
48	Brown Bear	Gertrude Chilton and Imogene Flore, 123 Schreiner Place, San Antonio, Texas	7	4S	20E	MD	Patented property consisting of 41 acres near the South Fork of the Merced River. Two claims, the Brown Bear and Brown Bear South Extension.
	Buckeye						See Granite King.
	Buckingham Mountain						See Mount Buckingham.
49	Buena Vista group (Busch, Washington--Buena Vista)	C. W. and Velma Worley, Mariposa	20,21 28,29	4S	18E	MD	Located in Colorado district 5 airline miles north and slightly west of Mariposa. Property consists of three patented claims, the Washington, Buena Vista, and Phoenix. Formerly included the Talc, Lucky Lindy, and Charles. Close to the Cleveland claim on the north but not adjoining it. (Lowell 16:578; Castello 20:109; Laizure 24:120-121; herein.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
50	Buffalo (San Domingo)	Vernon and Clara Tharp, 1850 Central Avenue, Alameda	SW¼ 13	4S	18E	MD	Located 4 miles north of Midpines on Trabucco Creek (Castello 20:136; Boalich 22:365; Laizure 28:115; 35:29, herein).
	Bull Dog						See Permit.
	Bullion Hill						See American Eagle under Zinc.
	Bull Pup						See Permit.
51	Bunce	D. D. Martin, Box 1148, Mariposa	SE¼ 22	3S	18E	MD	On the east side of a tributary to Halls Gulch, half a mile west of the Briceburg-Kinsley road. Quartz vein 1 to 3 feet wide strikes N. 35° W. and dips steeply east. Wallrocks are black slate of the Paleozoic Calaveras group. Workings consist of several shafts, one at least 60 feet deep. Worked intermittently by the owner.
52	Bunker Hill (Squirrel)	Not determined	36	3S	19E	MD	On Pinoche Ridge 1½ miles southeast of Hites Cove. Located in 1851. Had one of the first quartz mills built in California. Equipped with wooden stamps. Owner (1920) Harry Taylor. Previous owner Charles Lewis. Rocks in this area are slate and dark hornfelses. Veins strike northwest and dip southwest. Mine was not precisely located during this investigation (Castello 20:109).
	Burkhart						See A-J.
	Burns Creek	Not determined; probably Frank Trabucco, Hornitos	34	4S	16E	MD	

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
53	Burr (Miles)	Not determined; mineral rights in this area reserved to T.H. Carlon	E½ NW¼ and SW¼ NW¼ 33	2S	15E	MD	Discovered about 1860 by a prospector named Miles or Miler. Early production, according to a private report by Carl S. Gilbert, was estimated to be $350,000. Shallow workings cover several acres. Blanket vein has a general north strike and a gentle east dip through greenstone wall rocks. A small tonnage of low-grade ore was mined during the period 1937-40.
	Busch						See Buena Vista group.
54	Butte	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	NW¼ 4	3S	16E	MD	A patented property. Adjoins the Potosi and D. Cook mines. There is no record of production for this mine and it was probably worked as part of the Potosi and D. Cook mines.
55	Butterfly	Not determined	5	4S	15E	MD	
	B. V. D.						See Arcturas.
56	Cabinet	Not determined; probably Ralph E. and Libbie N. Dailey, 1165 West 22d Street, Merced	15,16 22	3S	16E	MD	Located 1½ miles east of Horseshoe Bend on the Merced River. Adjoins the Crystal and Lookout claims. Two veins intersect approximately at right angles. The Cabinet vein, striking northwest and dipping steeply east, is intersected by the Crystal vein striking northeast. The latter is reported to contain cinnabar as well as gold. Wall rocks are greenstone (Turner and Ransome 97:7; Storms 96:216).
	Cader Idra						See Kaderitas.
	Caderitas						See Kaderitas.
	Calderon	Edna M. Bauer, Route 3, Box 252B, Merced	7	5S	16E	MD	Located 1 mile northwest of Hornitos. Unpatented. Quartz vein cuts metavolcanic wall rocks.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Calender and Calendonia						See Mountain King group.
	Calendonia						See Mountain King group.
	Cal-Penn-Tex group						See Black Bart group.
56A	Campo (Campodonica, Italian)	Not determined	NW¼ 16	5S	16E	MD	Located 1 mile east of Hornitos (Storms 96:216; Julihn and Horton 40:125; herein).
	Campodonica						See Campo.
	Canyon Wren	Not determined; last known owner (1937) was T. J. Patrick, Mariposa	21	6S	18E	MD	Located 1 mile northwest of Moore Hill or 7 miles east and slightly south of Cathay. Last active in 1937 when 45 tons of ore yielded 41 oz. of gold, 45 oz. of silver and 2747 pounds of copper (U. S. Bur. Mines records).
	Captain Aiken						See Virginia.
	Caroline						See Bean Creek group.
	Carrie Todd						See Texas Hill.
57	Carson (Bouvier)	Not determined; probably Inez Bouvier, et al., 1431 Moraga Street, San Francisco	3,4	4S	16E	MD	In Hunter Valley 8 airline miles north of Hornitos. Adjoins Iron Duke mine on the south (Castello 20:108; herein).
	Castagnetto I						See Pyramid.
	Castagnetto II						See under Copper.
	Castagnetto III						See Chemisal under Copper.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Castagnetto IV	Mrs. Mary Castagnetto, 2739 Ritchie Street Oakland 5	26	2S	16E	MD	Located 2 miles northeast of Coulterville on the Greeley Hill road. Small tonnage of low-grade ore was mined in 1941. Quartz vein in greenstone and granodiorite.
	Cavagnaro						See Orange Blossom.
	Centuary (Century)						See Hasloe.
	Century						See Hasloe.
	Challenge, Pine Crest, and Pine Crest Extension	Not determined; probably P. W. Gallis, Hornitos	30	3S	16E	MD	One of several prospects in the vicinity of the Barrett, Castagnetto II, and Chemisal mines, Hunter Valley district. May be same property once known as the Ferrari mine. Geology and occurrence of ore similar to Barrett.
58	Champion I	Car Da Mining Company, a trust estate ($\frac{1}{2}$); Adelaide M. Ray ($\frac{1}{2}$), c/o C. P. Rose, 1259 North Fuller Ave. Hollywood	28 33	2S	16E	MD	On **Blacks** Creek 1-3/4 miles northwest of Coulterville (Lowell 16:578; Castello 20:110; Laizure 28:83; Logan 34:183; herein).
59	Champion II	Belle McCord Roberts, 2625 East 10th Street Long Beach	34	4S	18E	MD	Located 1$\frac{1}{2}$ airline miles south of Colorado School and 5 airline miles northeast of Mariposa (Goodyear 90:302-304; Storms 96:216; Castello 21:110; Laizure 28:84, 101; herein).
	Champion III	Not determined	16	5S	17E	MD	Close to Mt. Bullion. Last active in 1903, producing 13.88 tons of ore yielding $332.75 or an average of $23.97 per ton at the prevailing price of gold (Logan 35:188). Quartz vein in slate.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Champion IV	Not determined	26 27	3S•	19E	MD	Located 4 airline miles northeast of Kinsley. Probably an old name for one of the Hite group of claims. (Aubury et al. 04:10). Quartz vein in slate.
	Chemisal (Castagnetto III)	Not determined					See under Copper.
	Chenoweth	Not determined	20	4S	17E	MD	Last active in 1901, producing 39.72 tons of ore which yielded $682.25 or $17.19 per ton (Logan 35:188).
	Cherokee I	Maizie Erickson, Le Grande	9,10	4S	15E	MD	Near Akoz zinc mine. Wall rocks are schistose metavolcanic rocks and massive greenstone. Mine last active in 1950 with a small production of gold and a larger production of silver.
	Cherokee II						See Lovely Rogers.
	Choteau and Sheridan						See Mary Harrison group.
	Clark Mines						See Our Chance.
60	Clearinghouse group (Anderson I, Ferguson, Original, Moonstone, Golden Rule, El Portal)	Frank E. Gallagher, 211 26th Street, Merced	16 21	3S	19E	MD	Six miles west of El Portal at Clearinghouse on the north bank of the Merced River (Storms 96:218; Lowell 16:593; Castello 20:106; Laizure 28:107; Young 29:320; Laizure 35:39; herein).
61	Cleveland	Not determined, probably H. H. Odgers, Midpines	28 29	4S	18E	MD	Lies between the Buena Vista lode and Cannon Gulch placer claims. Not patented. A 5-foot quartz vein strikes N. 70-75° E. and dips 70° N. Schistose greenstone wall rocks. Workings once consisted of an 86-foot shaft and 130-foot drift with several open stopes. Ore reported to occur on the hanging wall side of the vein (Laizure 28:83).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
62	Colorado	Corinne Kratzer, 555 Thirty Second Street, Richmond (1/6); F. E. and P. W. Judkins, 2817 San Pablo Avenue, San Pablo (1/3); Charles and Irma St. Johns, 619 Humboldt Street, Richmond (1/6); and Ellen N. Weston, 443 Ninth Street, Richmond (1/3).	27	4S	18E	MD	(Lowell 16:579-80; Castello 20:111; Laizure 28:83; herein.)
	Columbia						See Quartzburg group.
	Combination	Geo. W. and Bessie L. Welch, Bagby	SW$\frac{1}{4}$ 31	3S	17E	MD	A pocket mine in serpentine. Property consists of three unpatented claims. Intermittent moderate production, 1933-49, chiefly from pockets of high-grade ore. Inactive in September 1954.
63	Comet	T. A. Clarke, Comet Mine, Mariposa	22	4S	19E	MD	Located 1 mile northeast of Jerseydale on a fork of Skelton Creek (Storms 96:216; Lowell 16:580; Castello 20:111; herein).
	Compromise and Eubanks						See Marble Springs.
64	Confidence and Confidence Extension (Black)	Alma Investment Company, 1257 Shrader Street, San Francisco	SW$\frac{1}{4}$ SW$\frac{1}{4}$, NW$\frac{1}{4}$ 12	4S	19E	MD	Patented property consisting of 41 acres located 7 miles north of Darrah via the Devils Gulch truck trail or 1 mile south of Sims Cove on the South Fork of the Merced River.
	Congo	H. J. Buchenau, Star Route, Box 17, Madera	6 (?)	3S	17E	MD	Unpatented property 4 miles east of Coulterville. In 1894 workings consisted of a 300-foot cross-cut

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Congo (continued)						tunnel which intersected the vein 200 feet from the surface. Vein strikes northwest and dips 50° NE in slate and greenstone wall-rocks. Vein was described by Storms as large. Ore minerals are free gold, pyrite, and chalcopyrite. (Storms 94:168; 96:217.)
65	Consolidated Eureka II, Lafayette and Eastern Star	Frank A. Smith, c/o Mrs. Carol B. Shultis, 2716 Stuart Street, Berkeley 5	4,5 8,9	3S	16E	MD	Located 2 airline miles southwest of Coulterville at the northern end of the Horsehoe Bend Mountains, and south of Maxwell Creek. Worked in 1890's by Boglieli and Gotelli. Sold in September 1900 to Columbus Consolidated Gold Mining Company for $6000 (Min. and Sci. Press 1900, vol. 70, no. 13, p. 377). Patented property 59.44 acres. Northwest-trending northeast-dipping quartz vein cuts massive greenstone of the Upper Jurassic Penon Blanco volcanics (Taliaferro 43:283). Principal activity 1900-02 by the Columbus Company. No record of recent activity. Workings consist of several tunnels all in need of cleaning out.
	Consolidated Whitlock and Alabama						See Whitlock group.
	Contact Lode						See Big Break.
	Contention and Black Oak	Not determined	NW$\frac{1}{4}$ 11	3S	18E	MD	
	Cook mines or Cook Estates						See Malvina group and Mary Harrison group.
	Cook, D.						See Malvina group.
	Coronado						See Golden Key group.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
66	Cotton Creek	Not determined. Last operator was W. H. Hauser, 2469 Mavis Street, Oakland	NW$\frac{1}{4}$ 24	4S	16E	MD	Located a quarter of a mile east of the Hunter Valley road on Cotton Creek, 7 airline miles northeast of Hornitos (Julihn and Horton 40:120; herein).
	Coward						See Hasloe.
	Coyote Hall	Wallace L. Owen, 4443 Belmont Avenue, Fresno 2	11	6S	18E	MD	Located 1 mile southeast Indian Gulch. Northwest-trending quartz vein in slate wall rocks.
	Cranberry						See Rutherford and Cranberry.
	Cripple Creek	Not determined; probably Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	11	5S	18E	MD	Located a quarter of a mile east of Highway 140. Northwest-trending aplite dike 3 to 4 feet wide dips 45° SW. Serpentine and slate wall rocks. Gold occurs native and in auriferous arsenopyrite. Workings consist of a series of open cuts, an 80-foot inclined shaft, and several short drifts and crosscuts. Ore is very rich but in pockets. (Julihn and Horton 40:157-158.)
67	Crown Lead	Joseph and Emilie Kopf, 512 Seabright Street, Santa Cruz	36	3S	16E	MD	Patented property of 44.72 acres dating back prior to 1864. Operated at various times in conjunction with the Crown Peak and Red Bank or Stevenson group of claims. Has a long record of intermittent activity but only a small record of production. Well-defined quartz vein 3 to 10 feet wide striking N. 45° W. and dipping steeply northeast follows roughly the contact between a serpentine intrusion and slate of the Upper Jurassic Mariposa formation. Claim extends for more than 5500 feet along a branch of the Mother Lode. Vein matter is quartz-mariposite-ankerite rock. Principal workings were a 50-foot inclined shaft and a tunnel of unknown length, now caved. Idle. (Storms 96:217; Lowell 16:581.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
68	Crown Peak	Crown Peak Mining Company Ltd., Bear Valley	35 36	3S	16E	MD	Patented fractional claim of 13 acres adjoining Crown Lead mine on southeast. Operated jointly with Crown Lead and Red Bank or Stevenson group of mines at various times. There are two roughly parallel veins on either side of a dike-like intrusion of serpentine which cuts slate of the Mariposa formation. These strike N. 45°W. and dip northeast at an average of about 65°. Workings in 1914 consisted of a 45-foot inclined shaft and a 50 foot open cut. The shaft and adjoining workings are caved. (Storms 96:217; Lowell 14:581; Castello 17:113; Laizure 28:84.)
	Crown Point						See Mount Buckingham.
69	Crystal (Penobscott)	Ralph E. and Libbie N. Daley, 1165 West 22d Street, Merced	15 16	3S	16E	MD	Patented property consisting of 17.19 acres. Two parallel quartz veins, the Cabinet and Lookout, strike N. 40° W. and dip 35° NE. These range from 1 to 3 feet in width and contain chalcopyrite and bornite as well as native gold. These veins are crossed approximately at right angles by the vertical crystal vein which contains small crystals and blebs of cinnabar. Quicksilver was never recovered in commercial amounts. The Crystal vein is also gold-bearing (Turner and Ransome 97:7).
	Cuneo						See Talc.
	Daisy						See Red Bank.
70	Daliah	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	10 11	3S	16E	MD	Patented property consisting of 9.48 acres. One of numerous Mother Lode claims worked from time to time in conjunction with other claims and for which there is no separate record of operation or production. Claim is astride a small, southwest-trending auxiliary vein, part

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Daliah (continued)						of the Mother Lode system. Geology similar to Mary Harrison mine. One of Cook Estate mines.
	Dana						See Diana.
	Democrat						See Quartzburg group.
71	Diana (Dana, North Fork)	H. Barnes and E. Henriksson, c/o Diana Mine, Coulterville	SE$\frac{1}{4}$ 24	2S	17E	MD	Steep-dipping, northeast-trending quartz vein in slate and hornfels wall rocks. Small production in 1901 and 1941. Last ore mined ran .47 oz. of gold per ton.
72	Dillon	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	4	3S	16E	MD	One of the claims of the Potosi-Malvina group of mines near Coulterville. Lies between the Ninety Four and Bozeman claims and east of the Potosi claim. Apparently never was operated as a separate mine.
73	Diltz (Diltz and Mann, W.Y.O.D.)	Diltz Mines, a trust estate, c/o John P. Fulham, Mariposa	29	4S	18E	MD	On Sherlock Creek $5\frac{1}{2}$ miles north and slightly west of Mariposa (Lowell 16:581; Castello 21:113; Laizure 28:85; Laizure 35:29; Julihn and Horton 40:146; herein).
	Diltz and Mann						See Diltz.
74	Dolman (Oyler Lode, Oiler Lode, Hickman)	Not determined; probably Ellen T. Simpson et al.	29 33	4S	17E	MD	Former Las Mariposas Grant mine (Logan 35:188; Laizure 35:31-32; Julihn and Horton 40:128-130; herein).
	Dolph						Same as Hayseed. See Golden Key group.
	Dorothy						See Artru.
75	Doss (Doss and Thorne, Ginaca, Brooks)	Frank Trabucco Jr., Hornitos	28	5S	16E	MD	(Storms 96:218; Castello 21:114; Laizure 35:32; herein.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Doss and Thorne						See Doss.
	Douglass Mines						See Malvina group and Mary Harrison group.
76	Duncan	George D. Turner Route 1, Box 1049, Ceres	16 21	5S	16E	MD	Patented property consisting of 44 acres (Storms 96:218; Castello 21:114; Laizure 28:85; 35:32; herein).
	Dusenberry						See Golden Key group.
77	Early (Louisa, Felix, Revel, George Placer) group.	Robin H. Jackson and Edythe E. Jackson, Box 142, Mariposa	20 21	4S	19E	MD	Patented property of 80 acres (Lowell 16:581, 595; Castello 21:114, 135; Laizure 28:113; herein).
78	East Rutherford	Jessie and Winnie May Black, Route 1, Box 28, Cove, Arkansas	22	3S	19E	MD	Patented property consisting of 13.12 acres. Probably was once a part of the Rutherford and Cranberry mine.
	Eastern Star						See Consolidated Eureka, Lafayette, and Eastern Star.
	Eclipse						See Bandarita.
	El Carmen						See Mexican II.
	El Portal						See Clearinghouse.
79	Elizabeth (Stepping Stones, Nighthawk, Fools Choice)	Frank A. Casaccia, Mariposa	NW$\frac{1}{4}$ 5	5S	17E	MD	Former Las Mariposas Grant mine. Property consists of 4 acres on Corbetts Creek 3 miles south of Bear Valley. Active 1905-10, producing 132.37 tons of ore yielding $518.36 in gold or an average of $19.00 per ton at the old price of gold. Produced 8 tons in 1938 that yielded 7 oz. of gold. Vein averages 6 feet in width, strikes N. 40° W., and dips 50° NE. It is on or close to the contact between meta-andesite greenstone on the west and Mariposa

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Elizabeth (continued)						slate on the east. Workings in 1920 consisted of a 100-foot shaft, about 100 feet of drifts and a stope 100 feet high by 5 feet wide. (Storms 94:168; Lowell 16:581; Castello 21:114; Laizure 35:37.)
80	Ely						See Mary Harrison group.
81	Emma I	T. A. Clarke, c/o Comet Mine, Mariposa	36	3S	19E	MD	Located 1½ miles southwest of Brown's Peak and 1½ miles west of the Williams Brothers mine. Formerly part of the Little Wonder group of mines. According to Castello (21:115) and Lowell (16:582) there are two roughly parallel quartz veins striking northwest and dipping steeply northeast. The veins pinch and swell rapidly and ore shoots are small but commonly rich. In 1920 there was a 90-foot tunnel driven in the vein and several caved tunnels and surface workings above the land. One of the veins is reported to carry values chiefly in argentiferous galena.
82	Emma II	Fisher Research Laboratories, Inc., 1961 University Avenue, Palo Alto	29 32	4S	18E	MD	Property consists of two fractional claims, the Emma 1 and 2, totaling 28.92 acres. Patented. Adjoins the Sultana claim on the east and the Mohawk claim on the north. On the south extension of the North-trending Spencer vein. A second vein diverges from the main vein toward the northeast. Developed by a 40-foot shaft and short lateral workings. Greenstone wall rocks. Inactive in 1956.
	Empire						See Spread Eagle group.
83	Enterprise (Barcroft)	H. L. Gorton, Route 4, Box 184, Turlock owns two unpatented claims, the Enter-	34	4S	16E	MD	Mine discovered prior to 1880. R. W. Barcroft of Hornitos was first owner of record. Quartz vein strikes northeast and dips 30° SE. Slate and greenstone wall rocks. Intermittently active 1880-1912, 1935, 1940.
			2,3	5S	16E	MD	

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Enterprise (continued)	prise and Enterprise Extension No. 1. Horace Meyer, Cathay, et al., owns one patented claim, the Enterprise Extension No. 2, consisting of 20.66 acres.					Last two shipments of ore ran about 0.3 oz. of gold per ton and 1/2 oz. of silver. Had a 120-foot inclined shaft in 1904. (Wilkinson 04:10.)
	Epperson						See Bean Creek group.
	Ethel May	J. V. Lloyd, 3154 Lincoln Boulevard, Omaha, Nebraska	11	4S	17E	MD	Patented property consisting of 20.27 acres. Northwest-trending vein in slate and schist wall rocks of the Paleozoic Calaveras group.
	Eubanks						See Marble Springs.
84	Eureka I (Eureka 1 and 2)	Russell G. Fournier, Box 21, Mariposa	2	5S	19E	MD	One unpatented claim on the west slope of Mount Buckingham close to the Mount Buckingham mine. Quartz vein averages 2 feet in width, strikes east and is nearly vertical. Slate wallrocks. Workings consist of three adits driven on the vein, the lowermost 400 feet long, the middle 300 feet long and the upper 30 feet long. The lower two tunnels are 50 feet apart and the upper adit is 100 feet above the middle adit. Produced several hundred tons of ore between 1927 and 1940 that averaged 0.845 oz. of gold and 0.32 oz. of silver per ton (Laizure 28:86; 35:32; Julihn and Horton 40:154-155).
	Eureka II						See Horseshoe.
85	Eureka III (Eureka Sky High)	Not determined	23 35	3S	19E	MD	A very old property active prior to 1868. Snyder vein is $3\frac{1}{2}$ feet wide. Slate walls. Vein matter is galena, sphalerite, pyrite, native gold, and tellurides in

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Eureka III (continued)		or 36?				quartz. Much of the ore mined between 1868 and 1880 ran between $40 and $100 per ton at the prevailing price of gold. Ore was milled in a water-powered arrastra. (Min. and Sci. Press, 1868, vol. 17, no. 15, p. 230; 1879, vol. 38, no. 13, p. 197; 1879, vol. 39, no. 5, p. 5.)
	Eureka IV						See Consolidated Eureka, Lafayette and Eastern Star.
	Eureka V						See Quartz Mountain.
86	Evans I	Pacific Mining Company, Crocker Building, San Francisco 4	8	4S	17E	MD	Located half a mile east of the Pine Tree mine and Highway 49. North-trending quartz vein dips steeply east. Wall rocks are chiefly massive greenstones of unknown age. Work done mostly prior to 1880. Principal working is a drift adit with short connecting workings totaling about 400 feet. Last worked in 1941 when 2 tons of high-grade ore were taken out. Idle.
87	Evans II	Not determined	14	5S	19E	MD	Located 1 mile northeast of Mariposa adjacent to Grizzly Gulch. An old working long abandoned and almost obliterated. According to Storms (96:169) one vein strikes north and dips 70° E. in greenstone walls. A second vein system consisting of several parallel veins strike northwest and dip 20-30° E. A third, well-defined vein strikes northwest and dips 45° W., wall rocks being slate and a dike rock. Soil and the softer parts of the veins near the surface have been extensively placered. Underground workings probably are not extensive. A pocket mine.
88	Exchequer	Not determined	7	4S	16E	MD	At confluence of Cotton Creek and the Merced River. Partly under waters of Exchequer Lake. A well-defined quartz vein striking northwest crosses the Merced River.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Exchequer (continued)						Worked in 1880's. Property once consisted of seven claims.
	Fanny						See Spread Eagle group.
	Farber group						See Lena Farber and Sunset.
	Farmers Hope (Miners Hope)						See Spread Eagle group.
89	Feliciana	Gold Ledge Mining Company, c/o Walter Gleeson, Merchants Exchange Building, San Francisco 4	12 13	4S	18E	MD	Includes Feliciana and Feliciana Extension Nos. 1-7 (Lowell 16:582; Castello 21:115; Laizure 28:86-88; 35:33; herein).
	Felix						See Early.
	Ferguson						See Clearinghouse.
	Ferrari						See under Copper.
90	Fick and Oxford	Not determined	27	4S	18E	MD	Adjoins Colorado mine on the north, just west of Colorado School and 6 miles northeast of Mariposa. The extension of the Colorado vein averages 18 inches in width and is developed by three open cuts and a 60-foot crosscut adit. Samples from open cuts assayed $4.50 to $7 per ton in gold (Julihn and Horton 40:153).
	Flannigan						See Bob McKee.
91	Floranita	Not determined	6	2S	16E	MD	

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Fools Choice						See Elizabeth.
	Formation Logging Company	Formation Logging Company, E. R. Peters, Los Angeles	31	3S	17E	MD	A small mine first opened about 50 years ago. Workings consist of a crosscut adit driven east and a short north drift. Wall rocks are greenstone. Under development in the summer of 1956.
92	Fortuna--Esperanza-Cube group	Manuel G. Parra, Route 4, Box 3189-A Sacramento	26 27	3S	17E	MD	Property consists of several claims east of Solomon Gulch and northwest of the Black Bart mine. Northwest-trending northeast-dipping vein series cuts greenstone. Small production of $35 per ton ore in 1952. District is noted for its pockets of high-grade ore.
	Fournier						See B and M.
	Frances						See Francis.
93	Francis (Frances)	Gold Recovery Corp., c/o T. S. O'Brien, Box 223, Ione	SE$\frac{1}{4}$ 19 NE$\frac{1}{4}$ 30	6S	18E	MD	Patented property of 20 acres discovered in 1850's. Intermittently active until 1903. Some development but little or no recorded production in 1930's. In 1900 was equipped with a 10-stamp mill and a 40-ton cyanidation plant. Quartz vein 4 to 5 feet wide strikes northeast and dips 45° SE. Granodiorite and schist wall rocks. In 1903 workings consisted of a 300-foot inclined shaft with levels at 100, 200 and 300 feet. There were 180 feet of drifts on the 100-level, 300 feet on the 200-foot level and 200 feet on the 300-level (Min. and Sci. Press, 1900, vol. 70, no. 3, p. 77). Prior to that time there were two adits, a lower one 140 feet long and an upper one 250 feet long, and a 70-foot crosscut. The upper adit was connected to the surface by a raise (Min. and Sci. Press, 1886, vol. 52, no. 7, p. 76 and vol. 59, no. 11, p. 204). Inactive in 1954.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Franklin and McKinley	Harold H. and Anita Bondshu, Mariposa	19	4S	18E	MD	Unpatented property on the northwest extension of the Milburn-Permit-Geary vein system. Northwest-trending quartz vein in greenstone wall rocks. No recent activity.
94	French	Pacific Mining Company , 1022 Crocker Building, San Francisco	9,16	4S	17E	MD	One mile east of the Pine Tree mine and Highway 49 (Laizure 35:33; herein).
	French Camp	Not determined	4	5S	18E	MD	Northwest-trending vein system in greenstone. Active 1908-12, producing 109 tons of ore which yielded $2177.34 or an average of $19.96 per ton. Former Las Mariposas Grant mine (Logan 35:188).
	Frenchman I						See Mount Gaines.
	Frenchman II						See Mebold I.
	French Pocket						See French.
	Funk						See Hasloe.
	G. Douglass						See Malvina group and Mary Harrison group.
95	Garibaldi (Blue Lead)	Robert O. Greeves, Box 151, Columbia	4,9	3S	18E	MD	Located 1 mile west of Kinsley Guard station on the west. side of Skunk Gulch (Julihn and Horton 40:135; herein).
	Geare						See Geary.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
96	Geary (Geare)	Permit Mining Company, 1063 Howard Street, San Francisco	SE¼ 30	4S	18E	MD	In Whitlock district between Nutmeg and Permit mines (Lowell 16:582; Castello 21:116; Laizure 28:88; Julihn and Horton 40:152; herein).
	Geneva	Irene Van de Carr, 5421 Broadway, Oakland 18	10	4S	16E	MD	On patented agricultural land on west side of Hunter Valley. Quartz vein in greenstone. Principal working is a 60-foot shaft, caved (Castello 21:116). No record of recent activity.
	Gentry Gulch						See Hasloe.
97	Georgia Point	John A. Woods, et al., 522 Hoyt Street,. El Monte	26 27 35	3S	19E	MD	Patented property consisting of the Spring Tunnel, Georgia Point, and South Side claims and the South Side Mill site. Vein is probably an extension of the Hite system. Worked principally in the late 1870's by the South Hite Mining Co.; workings believed to be superficial. Geology similar to Hite mine. Idle.
	Georgiana	Not determined;.probably Pacific Mining Company, 1022 Crocker Building, San Francisco	10 15	4S	17E	MD	A very old property long abandoned. In vicinity of the Evans mine. Quartz vein 8 to 18 inches wide strikes East and stands vertical. Vein matter is milky quartz and pyrite with native gold. Former Las Mariposas Grant mine (Storms 96:218).
	Ghirardelli						See Lafayette.
	Gibbs						See Williams Brothers.
	Gilmore vein	Not determined	34 35	5S	18E	MD	In Buckeye Gulch north of the Mormon Bar-Le Grande road. Former Las Mariposas Grant mine. Last active 1900-02 and 1912-13. During these periods 85.12 tons of ore was mined that yielded $1633.05 or an average of

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Gilmore vein (continued)						$19.20 per ton at the old price of gold (Logan 35:188). May be an extension of the Buckeye vein system.
	Ginaca						See Doss.
98	Gold Bar	Earl A. Robinson, Coulterville	32	2S	18E	MD	In the Bull Creek district three-quarters of an airline mile east of the Marble Spring mine and three-quarters of a mile southwest of Bull Creek School. Opened in 1936, development work done intermittently up to present. Quartz vein in slate, quartz biotite hornfels, and greenstone. Workings consist of a 35-foot shaft and a 138-foot crosscut driven to intersect the vein below bottom of shaft. No recorded preoduction. Equipped with a wooden headframe and ore bin.
	Gold Bring	Not determined	4	5S	17E	MD	Former Las Mariposas Grant mine. One mile east of Elizabeth mine and east of Cow and Calf Creek. Quartz vein in slate walls. Last active 1901-02, producing 24.8 tons of ore which yielded $1724.44 or an average of $70.35 per ton at old price of gold. Presumably a pocket mine (Logan 35:188).
99	Gold Bug	N. D. Madden and K. I. Goulder, c/o Boy Construction Company, Ltd., Shelly Building, Vancouver, British Columbia	28 33	3S	17E	MD	In Solomon Gulch 1 mile west of Black Bart mine (Julihn and Horton 40:142; herein).
100	Gold Coin	Not determined; last known operator (1938) was J. K. Wadley, Texarkana, Arkansas	14 23	3S	16E	MD	Pocket mine on west slope of Whites Gulch a quarter of a mile east of Adelaide mine and $3\frac{1}{2}$ miles by dirt road from State Highway 49 and the Mary Harrison mine. On a branch of the Mother Lode vein system which strikes slightly west of north and dips about 70° E. The main

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Gold Coin (continued)						vein, which is well defined, is cut by numerous northwest-trending stringers which contain pockets of high-grade ore. Slate wall rocks. About $15,000 was produced from the mine in 1938. The amount produced from pockets prior to 1938 has not been recorded (Julihn and Horton 40:127).
	Gold Hill	J. E. Rea Jr., Box 243, Madera	NE¼ 12	5S	17E	MD	Former Las Mariposas Grant mine. Active 1900, 1905-07, 1912-15, producing 232.10 tons of ore yielding $3519.60 or an average of $15.30 per ton at the old price of gold. Quartz vein strikes N. 62° W. and dips steeply east following the contact between slate of the Mariposa formation (Upper Jurassic) and massive pyroxene andesite greenstone of unknown age (Logan 35:188; Turner and Ransome 95:econ. map).
101	Gold King (Martin-Walling)	Russell G. Rowe, Route 7, Box 1499, Modesto	11	3S	17E	MD	In the Gentry Gulch district in the vicinity of Hasloe and Lovely Rogers mines. Adjoins the Lovely Rogers on the southeast. Discussed herein.
102	Gold King group	Not determined; last operator (1928) was Gold King Mining Company, Box 1648, Modesto	29 32	2S	18E	MD	Last active in 1926-27. Company drove a 1445-foot adit believed to cut the vein 1185 feet from portal (Laizure 28:89).
103	Gold Star	Mrs. E. B. Easton, El Portal	21,22 27	3S	19E	MD	On State Highway 140 midway between Indian Flat and Clearinghouse. Unpatented property consisting of 13 claims. Adjoins Hite group of claims on west and is on the probable west extension of the Hite vein system. Several parallel veins strike N. 40-45° W. and dip very steeply northeast. Wall rocks are slate and hornfelsic slate cut by narrow dikes of aplite and fine-grained quartz diorite. Workings consist of a main

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
							crosscut-adit 412 feet long driven S. 40° W., open and in good condition in September 1954, and a second adit 56 feet long, caved and inacessible. Mine is equipped with track, mine cars, and hoisting equipment, but no mill. Had small production from 1936-52.
104	Golden Eagle	Worth A. Brown, Capitola	27	4S	16E	MD	Patented property consisting of 8.3 acres 4½ airline miles northeast of Hornitos via the Hornitos-Bear Valley road. Blanket vein strikes N. 70° W. and dips very gently south. Wall rocks are felsitic volcanics belonging to the Upper Jurassic Amador group. Workings consist of numerous open cuts and pits. Some exploration work was being done in September 1954.
105	Golden Gate I (Schlageter group)	Not determined	18 19	4S	17E	MD	Two airline miles northwest of Bear Valley and half a mile northwest of the Yellowstone mine. Broad quartz-mariposite vein strikes northwest and stands vertical. Wall rocks are schistose greenstone. Workings consist of a 210-foot shaft, a crosscut adit 250 feet long, and a 20-foot raise, presumably from the end of the crosscut (Lowell 16:583; Castello 21:116; Laizure 28:89).
	Golden Gate II						See Golden Key group.
106	Golden Key group (Austin group)	Golden Key Mining Company, Route 1, Box 105D, Gilroy	29 32	4S	18E	MD	Includes Golden Gate, Coronado No. 2, Hayseed, Haywire, and Regan claims. Once known as the Dolph mine (Preston 90:306, 308; Storms 94:170; 96:218,222; Lowell 16:576, 583; Laizure 28:79: 35:33; Julihn and Horton 40:151; herein).
	Golden Rule						See Clearinghouse.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
107	Gonzales (Houghton and Gonzales)	Laura I. O'Day, 715 Paseo del Mar, Palos Verdes Estates	SE¼ 34	5S	16E	MD	Patented property consisting of 20 acres on the south slope of Santa Cruz Mountain 1 mile northwest of Indian Gulch. Quartz vein in slate and metavolcanic wall rocks. Principal period of activity was in 1880's.
108	Good Luck and Horseshoe	Minnie Meyer, c/o Kenneth Meyer, Midpines	25	4S	18E	MD	Unpatented claims near Highway 140 west of Bear Creek and north of Timber Lodge. Inactive.
	Grand Prize and Badger						See Oakes and Reese.
109	Granite King and Live Oak (Buckeye, Billings)	Edith McElligott, 1404 Poplar Avenue, Fresno	3,10	6S	18E	MD	On southern border of Las Mariposas Grant in Buckeye Creek district (Logan 35:188; Julihn and Horton 40: 134; herein).
	Gray Eagle						See Black Spider.
110	Greens Gulch and Greens Gulch Extension	Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	12 13	5S	17E	MD	On south side of the Mount Bullion-Hornitos road 3/4 of a mile wide west of Mount Bullion. Las Mariposas Grant mine (Laizure 28: table facing p. 98; herein).
	Grimshaw						See Ruth Pierce.
	Grizzly Gulch	Frank Cassacia, Mariposa	14	5S	18E	MD	A small mine located in Grizzly Gulch, a tributary to Missouri Gulch, half a mile north of Mariposa. Active in 1909 and 1915, producing 40.5 tons of ore which yielded $428.95 or an average of $10.60 per ton at the old price of gold. Workings have been largely obliterated. Former Las Mariposas Grant mine. Geology similar to Mariposa mine.
	Guadeloupe	Not determined	32	5S	18E	MD	In Guadeloupe Mountains near Agua Fria Creek, 18-inch quartz vein in granodiorite. Active 1904-05, 1913,

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Guadeloupe (continued)						1915, producing 83.04 tons of ore which yielded $1932.45 or an average of $23.21 per ton at the old price of gold (Lowell 11:16,583; Logan 35:188).
	Guest	Not determined	35	4S	16E	MD	Narrow quartz vein 2 to 8 inches wide in slate. Had 50-foot shaft in 1914 (Lowell 16:583).
178	Gypsy (North Star and Oro Grande)	Linden E. Foran, Mariposa	32	4S	18E	MD	Southern extension of the South Whitlock Extension claim. Vein of white quartz 1 to 3 feet wide strikes roughly north and dips 30-40° E. Greenstone wall rocks. Workings consist of an inclined shaft, caved, and several pits. Inactive in August 1954. Samples taken in 1927 ran from $4.12 to $50.00 per ton (Laizure 28:104).
	Hacker	Not determined	21	5S	18E	MD	Former Las Mariposas Grant mine located near Arkansas Flat north of Highway 140. Quartz mariposite veins in slate. Active 1906, 1908, 1909, producing 27.22 tons of ore yielding $1338.28 or an average of $49.16 per ton at the old price of gold (Logan 35:188).
	Hard Luck	Mrs. Clara Schilling, Bagby	24	3S	17E	MD	Quartz vein in slate.
	Hardscrabble	Not determined	11	5S	17E	MD	Former Las Mariposas Grant mine active 1903-04, producing 16.84 tons of ore which yielded $301.84 or an average of $17.91 per ton at the old price of gold.
	Hartford						See Quail.
111	Hasloe (Gentry Gulch, Funk, Coward, Hasloe and Centuary)	Walter D. McLean, Joseph Duoret Jr., Ralph J. Jacobs and R. S. Hudgson, c/o Walter D. McLean, Coulterville	1,2	3S	17E	MD	In Gentry Gulch 5½ airline miles southeast of Greeley Hill and 8 airline miles east of Coulterville (Browne 68:32; Storms 94:169; 96:218; Castello 21:118; Laizure 28:126; herein).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hasloe and Centuary						See Hasloe.
	Hathaway-Bondurant						See Bondurant.
	Hauser						See Cotton Creek.
	Hayseed						See Golden Key group.
	Haywire						See Golden Key group.
112	Helena	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	NW¼ 4	3S	16E	MD	A patented property, one of the claims of the Mahoney group. Probably never operated as a separate mine. See Mahoney.
	Hickman						See Dolman.
113	Hite (Arkell, Hite and Wynant)	Cyrus Bell, 160 South Fairfax, Los Angeles	22 26 27	3S	19E	MD	Includes Priest and Coleman, Hite, Giltner, Summit, McConley, and Old Dominion claims as well as several mill sites. At one time, probably included the Hite Central, Spring Tunnel, Georgia Point, and South Side claims. (Browne 68:34; Goodyear 88:344; Storms 94:170; 96:218; Lowell 16:583-4; Castello 21:118; Laizure 28:90, 125-128; Julihn and Horton 40:145-6; herein.)
114	Hite Central	Nick Flaco and Willard Woodbury, Mariposa (3/4), and Maddox Bros., et al., c/o M. Maddox, Box 483, Austin, Texas (1/4)	27	3S	19E	MD	Patented property consisting of 4 acres. Adjoined Hite mine on the southeast. Geology similar to Hite mine. Superficial workings. Idle.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hite and Wynant						See Hite.
	Home						See Schroeder group.
	Homestake						See Last Chance I.
115	Horseshoe I (Bower Cave)	Joseph Dupret Jr. and Irene Dupret, Star Route, Box 21B Cazadero	NE$\frac{1}{4}$ 23	2S	17E	MD	Patented property consisting of 20 acres on Jordan Creek 3/4 of a mile northwest of Bower Cave and 8 airline miles northeast of Coulterville (herein).
116	Horseshoe II (Eureka)	Not determined	23	4S	16E	MD	At the south end of Hunter Valley close to and on the west side of the paved Hunter Valley road. An old property active mainly in 1895-97. Quartz vein 2 to 5 feet wide strikes N. 60° W. and dips 65° SW. In 1895 the shaft was 100 feet deep, had a north drift 100 feet long and a south drift 40 feet long. Ore averaged about $11 per ton at the old price of gold. Ore contains a large percentage of pyrite (Min. and Sci. Press, 1895-97, vols. 73, 75; Eng. and Min. Jour. no. 24, p. 568, 1895; Castello 21:119).
	Houghton and Gongalez						See Gonzales.
117	Independence I (Twin Springs)	Charles Jordan 633 Green Avenue San Bruno	NE$\frac{1}{4}$ 23	3S	18E	MD	On the Jenkins Hill road half a mile (airline) east of the Briceburg-Kinsley road but about 3$\frac{1}{2}$ miles from the Briceburg road via the Jenkins Hill road. Described herein.
	Independence II or Independencio						See Juniper.
	Indian Gulch	Louis and Dorothy E. Erickson, Hornitos	SW$\frac{1}{4}$ 34	5S	16E	MD	Patented property consisting of 20 acres. Inactive over 50 years.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Iowa and New York	Charles H. Carleton, 1544 Jonquil Terrace, Chicago 26, Illinois	29	4S	19E	MD	Unpatented property in Jerseydale district near Sweetwater mine. Quartz vein in granitic wall rocks. No recent production.
118	Iron Duke	Mrs. Louise M. Broad, 3469-20th Street, San Francisco, 10	NW$\frac{1}{4}$ 4	4S	16E	MD	In Hunter Valley 8 airline miles north of Hornitos. (Laizure 35:34; Julihn and Horton 40:119; herein.)
			SW$\frac{1}{4}$ 23	3S	16E	MD	
119	Isola	Not determined	4	3S	16E	MD	See Malvina group.
	Italian						See Campo.
120	Jackson	Not determined	1	3S	15E	MD	Located $1\frac{1}{2}$ miles east of Granite Spring School on the Coulterville-Hayward-La Grange road. Northwest-trending quartz vein in greenstone and green schist. Idle.
121	Jenkins Hill		18	3S	19E	MD	On west side of Miller Gulch half a mile north of the Merced River and State Highway 140 adjacent to former property of Yosemite Portland Cement Company. Discovered in 1850's. Mill swept away in flood of 1862. Worked in 1919 and 1927. Owned in 1927 by W. J. Schofield of Oakland and A. B. Smith of San Francisco. Vein of sugary quartz 4 inches to 3 feet wide contains auriferous sulfides but little or no free gold. Wall rocks are slate and granite. Workings consist of two drift adits 90 feet apart, one above the other, connected by a raise. Lower adit is 432 feet long (Laizure 28:90-91).
	Jenny Lind						See Washington.
	Josephine						See Pine Tree and Josephine.
	Josie						See Number Nine.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Jubilee						See Red Bank.
	Jumbo						See Blue Bell.
122	Jumper	Not determined	30	4S	17E	MD	On Bear Valley Mountain half a mile south of the Juniper mine (Laizure 28:91; 35:34; herein).
123	Juniper (Juniper and Patricia)	Pereno O. Zirker, Pearl Crowell, Ella B. Edwards, and Hallett B. Hammatt, 832 Franklin Street, Monterey	19 30	4S	17E	MD	Property consists of one patented claim of 20 acres and several unpatented claims on Bear Valley Mountain $2\frac{1}{2}$ miles west of Bear Valley (Storms 94:171; Laizure 35:42; herein).
	Juniper and Patricia						See Juniper.
124	Kaderitas (Caderitas, Cader Idra, Little Wonder)	T. A. Clarke, c/o Comet Mine, Mariposa	31	3S	20E	MD	On the south slope of Brown's Peak $3\frac{1}{2}$ airline miles southwest of El Portal. Adjoins the Mexican (El Carmen) mine on the south. Once called Mina de la Libertad. Quartz vein strikes N. 40° W. and dips 70° NE. Vein thickens and thins rapidly, ranging from a few inches to 4 feet wide. Vein matter is gold, pyrite, arsenopyrite, galena, and sphalerite in a gangue of milky quartz and fractured wall rock. Wall rocks are graphitic slate and schist with intrusions of biotite granodiorite. Mine workings are an adit 100 feet long and several superficial workings above this level. Last worked in 1953-54 by Pacific Placers Engineering Company of El Portal. Idle in 1955. Worked for a time in 1920-26 as part of the Little Wonder group of mines. (Wilkinson 04:10; Laizure 28:94.)
125	Kane	Mariposa Mining and Commercial Company,	13	5S	18E	MD	On southwest slope of Kanes Hill at junction of Stockton Creek and Rocky Gulch, 1 mile east of Mariposa. Lam-

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Kane (continued)	c/o Eileen Milburn, Mariposa					inated quartz vein carrying gold, galena and pyrite strikes N. 20° W. and dips steeply SW. Vein averages 3 to 4 feet wide and is exposed for 1300 feet. Principal working is a 170-foot crosscut-adit driven into the southwest slope of the hill which taps the vein 100 feet below the surface. There is also a 50-foot shaft directly above these workings and numerous open cuts along the surface outcrop of the vein. Wall rocks are pyroxene andesite greenstone, granite dike rocks, and serpentine. Last worked 1938-1940 by G. C. and L. G. Kane of Mariposa. Idle. (Julihn and Horton 40:157.)
	Kane Quartz						See Barney Kane.
	Kangaroo	Not determined. Probably Mariposa Mining Company, c/o Eileen Milburn, Mariposa	4	5S	17E	MD	Quartz vein in slate walls. Last active in 1903, producing 5.52 tons of ore from which $162.01 in gold was extracted, or an average of $29.38 per ton (Logan 35:188).
	Kate Kearney						See Red Cloud.
	Key Extension						See Number Nine.
	Key Lode						See Number Nine.
	Kid Saxon						See Mebold 1 group.
126	King Midas	Not determined; former Las Mariposas Grant mine.	8	5S	18E	MD	Discovered in 1925. Under lease in 1927-28 to J. N. Knight and associates of Mt. Bullion. Close to State Highway 49 one mile east of Mt. Bullion. Gold occurs chiefly in serpentine in a series of 5 parallel shear zones striking northwest and dipping about 70° NE. Gold has been deposited in thin seams of gouge along joint planes and in fractures in talc-serpentine schist. Except for several surface cuts the main workings are an

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	King Midas (continued)						inclined shaft 50 feet deep and a vertical shaft 100 feet deep located 200 feet to the southeast. Mill runs on vein matter taken out during development work returned $10 per ton with mill tailings running $4.29 per ton and sulfide concentrates running as high as $190 per ton (Laizure 28:93).
	King Saxon						See Mebold I group.
	King Saxon and Queen Saxon						See Mebold I group.
127	King Solomon	John M. Graham, 1090 Carolyn Avenue, San Jose 25	SW¼ 14	4S	18E	MD	Patented claim and mill site totaling 25.16 acres in the Briceburg district 2 miles south and slightly east of Briceburg. Near Highway 140, three-fourths of a mile north of its intersection with Trabucco Creek. Adjacent to Roma and Lena Farber group of claims. Last worked in 1920, last production in 1911. Quartz vein 1½ to 2 feet wide strikes northeast, and dips 70° SE. Pyroxene andesite greenstone wall rocks. Workings in 1920 consisted of a 70-foot tunnel connected with a 60-foot raise and some drifts. Idle. (Castello 21:137; Laizure 28:117.) Formerly, operated as part of the Sierra Rica mine.
	Klondike and Last Chance						See under Copper.
	Kockel						See Permit.
	Kohler						See Bean Creek group.
	Lacy						See Mockingbird I.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	LaFayette and Eastern Star						See Consolidated LaFayette, Eureka, and Eastern Star.
	LaFayette and LaFayette Extension (Ghirardelli)	Louis and Gabriel Queriolo, 861 San Ramon Way, Sacramento	15	4S	16E	MD	On patented agricultural land astride the Hunter Valley Road, 6½ airline miles northeast of Hornitos. (Castello 21:119; Laizure 28:93; herein.)
	Lakeview						See Last Chance II.
128	Landrum (Simeon Landrum, Barley Field)	George Matlock, Mariposa	27 34	4S	18E	MD	Located 1 mile south of Colorado School and 5½ airline miles northeast of Mariposa (Storms 96:216; Lowell 16:585; Castello 21:120; Laizure 28:94; herein).
129	Last Chance I (Homestake)	E. D. Foster and Hazel Hansen, c/o E. D. Foster, 1279 Eagle Vista Drive, Los Angeles 41	15	3S	17E	MD	Unpatented property of four claims, the Pine Flat Nos. 1, 2, 3, and the Homestake. An old property once equipped with a five-stamp mill. Quartz vein in slate walls. Reported to contain high-grade ore. Present owner cleaned out and retimbered the inclined shaft to a depth of 125 feet. Total depth of shaft believed to be 300 feet. A hoist and pump are on the property. Idle at present.
130	Last Chance II (Lakeview, Mispah)	Mrs. Mary Attleweed, 2114 Mission Street, and Frank Davis, 729 Shotwell Street, San Francisco; C. W. Jessen, Hornitos	NE¼ 31	3S	16E	MD	In the northwest of Hunter Valley, about 9 airline miles north of Hornitos. Three unpatented claims. Country rock is greenstone. Property was surveyed in 1936, map shows 118-foot shaft with three levels and 187 feet of drifts driven along a quartz vein which strikes northwest. This shaft is now caved and a new 25-foot shaft has been opened. Produced a small tonnage of ore of good grade 1931-38.
	Last Chance III						See Klondike and Last Chance.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
131	Last Hope	Alice S. Owsley, Midpines	19 24 30	4S	18E	MD	Series of stringer veins in slate strike N. 35° W., dip 55° to 60° northeast. Workings consist of an open cut, several adit drifts on the vein system and several partly caved stopes. Idle in August 1954. Property consists of Last Hope 1 and 2 lode claims, Home placer claim, and Last Hope mill site, all unpatented.
132	Leach	M. Van de Carr, Briceburg	SE$\frac{1}{4}$ 33	3S	18E	MD	Located 1$\frac{1}{2}$ miles northwest of Briceburg and about 1 mile by unimproved dirt road from the graded Briceburg-Kinsley road. First worked about 1900-05 by Bell, Leach, and Charles Hartley. Quartz vein 1 to 3 feet wide strikes N. 25° W. and dips 75-80° NE. Vein is accompanied over much of its strike length by a fine-grained, light-green granitic dike. Ore minerals occur partly in ribboned quartz, partly in altered dike material and partly in altered wall rock next to the vein. They consist chiefly of pyrite, chalcopyrite, and native gold. Chief operating working is an inclined shaft about 50 feet deep with drifts and stopes aggregating 300 to 350 feet. An older crosscut tunnel about 60 feet long has extensive drifts at the end which apparently connect with the workings from the shaft. Present owner works the mine intermittently.
133	Lena Farber and Sunset IV (Farber group)	William O. Bolden, Midpines	23 14	4S	18E	MD	Patented property consisting of 32.4 acres in the Briceburg district just east of Highway 140 about midway between Midpines and Briceburg. Operated in the 1920's by the Feliciana Gold Mining Company. Owned in 1928 by United Building and Development Company of San Francisco. Adjoins Roma, King Solomon, and Sierra Rica mines and geology is similar. Workings thickly brushed over but believed to be superficial.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
134	Lewis Brothers (Northwest Extension of Princeton)	Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	13	5S	18E	MD	Described by storms (96:219) as a small, rich vein opened to a depth of 60 feet by several shallow shafts and connecting drifts. Active in 1921 producing 8.60 tons of ore yielding $105.86 or an average of $12.30 per ton (Logan 35:188). Typical Mother Lode vein in slate walls. A minor vein of the Mother Lode system.
135	Little Bear and Little Bear Extension (Pete Gordon)	Paul Miller, Box 1058, Merced	19	4S	19E	MD	On little Bear Creek 2 miles north of Midpines. There are three narrow veins on the property, the main one strking northwest and dipping 45° NE. Wall rocks are slate and various granitic rocks. Workings in 1920 consisted of a 175-foot adit, a 30-foot adit on the opposite side of the creek, a 12-foot winze, presumably from the main adit and a shallow shaft. (Lowell 16:584; Castello 21:120.)
	Little Charlie						See Spread Eagle group.
	Little Judge						See Oro Rico.
	Little Wonder						See Kaderitas.
	Live Oak						See Granite King and Live Oak.
	Live Oak group						See Live Oak and Governor.
136	Live Oak and Governor (Stud Horse Flat group, Live Oak group, White Oak group)	North American Gold Mines, Inc., Ada Stewart, 25 Delmar Avenue, San Jose 10	35	3S	16E	MD	South of the Merced River 2 miles northwest of Bagby (Lowell 16:598; Castello 21:139; Laizure 28:94; 35:34; Julihn and Horton 40:127; herein).
	London						See Banner group.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
137	Long Mary	Not determined	17	5S	17E	MD	Close to the Mount Bullion-Hornitos road 6 miles west of Mount Bullion (Lowell 16:586; Castello 21:121; herein).
138	Lookout	Not determined	15 22	3S	16E	MD	Located 3 airline miles south of Coulterville and 1 mile east of Horseshoe Bend on Exchequer Reservoir (Lake McClure). On the southwest slope of Horseshoe Bend Mountain adjacent to the Crystal and Cabinet mines. Claim is astride a northwest-trending quartz vein cutting pyroxene andesite greenstone of Upper Jurassic age. Idle over 50 years.
139	Los Parker	Los parker Mining Company, c/o Bill Parker, Midpines (1954)	13	4S	18E	MD	Feliciana Mountain district, about 2¼ airline miles southeast of Briceburg, on east side of Trabucco Creek. Six unpatented claims, the Bonanza nos. 1 and 2, Buckskin, Chilenian Nos. 1 and 2. Country rocks are metavolcanic and granitic. Mine opened in the 1930's. Quartz vein explored by a tunnel, now caved. In mid-1954 a new tunnel was begun. Equipped with air compressor and five-stamp mill.
140	Louis and Louis Extension	Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	11	5S	17E	MD	Las Mariposas grant mine, part of a parcel of land containing 240 acres (Lowell 16:586; Castello 21:121; Laizure 28:96; herein).
141	Louisa I (Louise, Louise Point)	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	3	3S	16E	MD	Astride Highway 49 a quarter of a mile south of Coulterville (Storms 96:219; Lowell 14:586; Laizure 28:96; Logan 35:183; herein).
	Louisa II						See Early.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
142	Louisiana	Sara W. Treat, c/o Mrs. Roger Sherman, 975 Roble Ridge, Palo Alto	25 26	2S	17E	MD	Located 12 miles by road east of Coulterville via the Greeley Hill, McDiermid station and Dutch Creek road (Min. and Sci. Press, 1866, vol. 12, no. 3, p. 40; Storms 96:219; Castello 21:96; Julihn and Horton 40: 136-138; herein).
	Louise						See Louisa I.
	Louise Point						See Louisa I.
143	Lovely Rogers (Cherokee II, Shimer)	Mrs. Nettie Hauck, et al., Yosemite National Park	2,11	3S	17E	MD	Half a mile south of Gentry Gulch and 1 mile southwest of the Hasloe mine (Browne 68:32; Storms 96:217; Lowell 16:587; Castello 21:122; Laizure 28:96; herein).
144	Lucky Boy	R. B. Sharp, Bear Valley	10	4S	16E	MD	Adjoins the French mine on the east and is on the east extension of the French vein. Principal working is a 5- by 7-foot crosscut adit more than 100 feet long connecting with a long drift and numerous stopes. There are several open stopes or air shafts between the mill building and the cabin. The main adit is equipped with track, ore car, ore bins, grizzly, jaw crusher, arrastra and ball mill. There is also a secondary crosscut adit several hundred feet long and also equipped with track and cars. Last recorded production 1950-52, a small tonnage of ore being mined which yielded about 0.6 ounces of gold per ton. Intermittently worked by the owner.
	Lucky Strike						See Manzanita.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Ludwig vein	Not determined; probably Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	18	5S	18E	MD	In vicinity of the Princeton mine to the northwest. According to Storms (96:219) the vein is in slate with a dike on the hanging-wall side. In 1896 workings consisted of three shafts, 180, 100 and 25 feet deep, respectively, and several hundred feet of drifts. Production has been recorded in 1900, 1902-05 and 1910. During this period 736.59 tons of ore yielded $9836.86 or an average of $13.37 per ton at the old price of gold. There has been no recent activity and the workings are hard to identify.
	Mahoney						See Malvina group.
145	Malone (Bear Creek)	Not determined	5	5S	19E	MD	Half a mile east of Bear Creek School and State Highway 140 (Preston 90:300-302; Lowell 16:587; Castello 21:122; Laizure 28:97; 35:36; herein).
146	Malvina group (Potosi, Mahoney, Douglass, D. Cook, Merced Co.,)	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles	4,9 10 32 33	3S 2S	16E 16E	MD MD	Patented property of over 300 acres includes the Boston, Mahoney, Glendive, G. Douglass, Miles, D. Cook, Helena, Potosi, Ninety Four, Dillon, Malvina No. 1, Malvina No. 2, Bozeman and Regina claims (Goodyear 88:347; Fairbanks 90:39; Storms 94:172; 96:220, 222; Lowell 16:587, 594; Castello 21:123; Laizure 35:36; Logan 35:183-84; Julihn and Horton 40:107; herein).
	Mammoth						See Quail.
	Mammoth group						See under Copper.
	Manzanita I	James A. Low and Edward A. Zeus, Box 29, Incline	31?	2S	18E	MD	About 13 miles east of Coulterville, probably near the Marble Springs mine. Worked in a small way before 1900, the quartz being crushed in an arrastra. A small production of gold and silver has been recorded from this mine for the period 1940-46. (Storms 96:220.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Manzanita II (Lucky Strike)	C. W. Jessen, Hornitos	31	3S	16E	MD	In the northwest end of Hunter Valley, about 9 airline miles north of Hornitos. Two unpatented claims. County rock is greenstone. Idle.
147	Marble Springs (Compromise and Eubanks)	George G. Glenn, 3134 East 10th Street, Oakland 1	30 31	2S	18E	MD	In the Bull Creek district $1\frac{1}{2}$ miles west of Bull Creek School and 2 miles south of Bower Cave. (Browne 68:32; Wilkinson 104:112; Lowell 16:580; Castello 21:123; Laizure 28:97; 35:46; herein.)
148	Margaret	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	33 34	2S	16E	MD	Patented property containing about 20 acres just west of Highway 49 in Coulterville. Adjoins the Louisa mine on the northwest. Worked intermittently prior to 1900 as part of the Mary Harrison group of mines, and earlier as an independent property. A typical Mother Lode vein occurrence similar to others on the east branch of the lode. Workings largely caved and inaccessible but probably not extensive. Details of production not recorded. Idle many years.
	Margaretta						See Silver Lead.
149	Marguerite	Louis Ferretti, c/o Magaret Tiscornio, 1633 Argonne Drive, Stockton 4	NE$\frac{1}{4}$ 6	3S	17E	MD	Pocket mine in northwest-striking shear zone near the contact between granitic rock and slate and hornfels metasediments of the Paleozoic Calaveras group. Intermittently operated by the owner.
150	Mariposa	Mrs. Frank E. Gallagher, 211 Twenty-Sixth Street, Merced	23 24	5S	18E	MD	On the southeast outskirts of Mariposa close to the Mormon Bar road (Browne 68:28-29; Storms 94:173, 220; 00:142; Lowell 14:587; Castello 21:124; Laizure 28:99; Logan 35:9, 184; Laizure 35:38; Julihn and Horton 40:155-157; herein).
	Martin-Walling						See Gold King.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
151	Martinez	Mrs. E. J. Hannah, 909 East Yosemite Avenue, Merced	21	5S	16E	MD	Patented property. Adjoins Duncan mine on southeast and is on the extension of the Duncan vein. This strikes N. 50° W., dips 45° NE and is 2 to 5 feet wide. Vein matter is milky quartz with pyrite and native gold. Wall rocks are schistose and hornfelsic volcanics and metasediments of the Upper Jurassic Amador group. Probably discovered prior to 1870. Produced 1000 ounces of gold between 1897 and 1899 from an unknown tonnage of ore. In 1917 lessees extracted $6,000 from a pocket (Eng. and Min. Jour., 1917, vol. 103, no. 2, p. 126). Between 1933 and 1939 a total of 835 tons of ore yielded 317.4 ounces of gold and 49 ounces of silver. (U. S. Bur. Mines records.) Idle since 1939.
152	Mary Harrison group (Ely, Choteau and Sheridan)	Walter J. Lautenschlager, 626 South Catalina Street, Los Angeles 5	3,10 11	3S	16E	MD	Patented property totaling nearly 80 acres near Coulterville on Highway 49. Includes the Balance, Choteau and Sheridan, Dahlia, Ely, and Venture claims and several mill sites. (Browne 68:34; Goodyear 88:346; Fairbanks 90:11, 124; Storms 94:173; 96:220; 00:146; Castello 21:124-25; Laizure 28:100; Logan 35:118; herein.)
	Massa Garden	Not determined; former Las Mariposas Grant mine	12	5S	17E	MD	In vicinity of Mount Ophir and Greens Gulch mines. Quartz vein in slate. Active 1900, 1905-07, 1910-15 producing 232.1 tons of ore yielding $3519.60 or an average of $15.30 per ton at the old price of gold. (Logan 35:188.)
	Mayflower						See Barney Kane.
	McCall						See Number Nine.
	McKee						See Bob McKee.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
153	Mebold I (King Saxon, Queen Saxon, Kid Saxon, Frenchman)	Thomas V. Bell Jr. et al., 317 East 26th Street, Merced owns the Kid Saxon claim. Others not determined.	21	4S	18E	MD	Unpatented group of claims on the east side of Saxon Creek 2 miles northwest of Colorado School and half a mile south of the Schroeder group of mines. Quartz vein 1 to 5 feet wide strikes N. 25° W. and dips southwest at about 45°. Wall rocks are chiefly black slate of the Paleozoic Calaveras group. Slaty cleavage strikes roughly parallel with the vein and dips steeply northeast. Workings consist of two drift adits 450 and 300 feet in length and several shallow shafts and short crosscut adits. Inactive in September 1955. Workings are strung out for about half a mile in a line roughly parallel to Saxon Creek. Ore reported to run from $4.12 to $22.40 per ton, from assay samples (Laizure 28:93).
154	Mebold II	Not determined	17	4S	19E	MD	On Sweetwater Creek northwest of Sweetwater mine. Quartz vein 2 feet wide in granitic rock. In 1916 had a 50-foot crosscut tunnel and short drifts. (Lowell 16:588.)
155	Menlo Consolidated (Aden)	Catherine Aden, c/o Dorman R. Mangels, 508½ Sacramento Street, Vallejo	22 23 26 27	4S	18E	MD	Patented property of 57 acres half a mile northeast of Colorado School. Includes the Ernestine, Menlo, and Mountain Queen claims. Northwest-trending vein system cutting metasediments and metavolcanics of the Paleozoic Calaveras group. Workings in 1916 consisted of a 300-foot crosscut, 180 feet of drifts and two shafts 105 and 40 feet deep respectively. (Lowell 16:575.)
	Merced Gold Mining Company						See Malvina group and Mary Harrison group.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
156	Merced River I	Percy L. Pettigrew, Box 639, Palo Alto, and Horace Meyer, Cathay	31 6	3S 4S	17E 17E	MD MD	Half a mile northwest of Bagby between the Merced River and Highway 49. Patented property of 19.58 acres. Northwest-trending quartz vein averaging 4 feet in width on or near the contact between serpentine on the east and slate on the west. Vein dips 60° NE. In 1904 workings consisted of a shaft 160 feet deep; three adits, the longest 165 feet; and at least 100 feet of drifts. Worked in 1879 with a water-powered arrastra, decomposed vein matter running $18 per ton (Wilkinson 04:11-12; Min. and Sci. Press, 1879, vol. 38, no. 13, p. 197).
	Merced River II	Not determined	15 16 22	3S	16E	MD	In Horseshoe Bend district in the vicinity of the Crystal and Cabinet mines. May once have included these properties. In 1916, the R. A. Keller and James Burns Company owned 13 unpatented claims. At that time workings consisted of a main shaft 100 feet deep with two levels and 210 feet of drifts. There was a second shaft 90 feet deep and a 230-foot crosscut. Once equipped with a 10-stamp mill (Lowell 16:588).
157	Mexican I	Not determined; probably Ellen T. Simpson et al.	28	4S	17E	MD	Located $1\frac{1}{2}$ miles south of Bear Valley (Laizure 35:31; Julihn and Horton 40:130; herein).
158	Mexican II (El Carmen)	Pacific Placers Engineering Company, El Portal	31	3S	19E	MD	On the south slope of Brown Peak $3\frac{1}{4}$ airline miles southwest of El Portal. Adjoins the Kaderitas mine on the north. Reached via the Williams Brothers and Kaderitas mine roads. Discovered about the same time as the Hite mine by Mexicans. Ore commonly high-grade but pockety. Two roughly parallel quartz veins 2 to 6 feet wide cross the property, striking N. 40-50° W. and dipping 70-80° NE. Developed by an old inclined shaft 150 feet deep

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mexican II (continued)						with 625 feet of drifts, and two tunnels 240 and 380 feet long, respectively. The shaft connects with one of the tunnel levels. Vein matter is ribbon quartz. Wall rocks are slate and massive quartz-biotite rock (Laizure 28:101). Inactive except for assessment work.
159	Mexican Diggins	Gold Ledge Mining Corporation, Merchants Exchange Building, San Francisco	7,8	4S	19E	MD	Located 1½ miles northeast of Feliciana Mountain. Sampled and explored 1949-51 by Gold Ledge Mine Corporation. Produced a small tonnage of high-grade ore from an old dump. Currently idle.
160	Midas	C. C. Kellogg and Adolph Bulla, 50 Twenty-Sixth Street, Merced	15	3S	16E	MD	On the west branch of the Mother Lode 1½ miles south of the Malvina group at the confluence of Buckhorn and Maxwell Creeks. Patented. Discovered in late 1860's or early 1870's, probably by Fred MacCrellish. Vein is 6 feet wide, strikes N. 32° W. and dips 65° NE. Slate wall rocks. Principal working is a shaft 150 feet deep with 625 feet of drifts. Shaft is watered and partly caved. Idle. (Wilkinson 04:11-12.)
161	Milburn	Beatrice Peregoy, 711 North Crescent Avenue, Lodi	31	4S	18E	MD	Adjoins the Permit mine on the south and is under lease to the Permit Mining Company. Quartz vein strikes N. 20° W. and dips very steeply east. Wall rocks are sheared greenstone of unknown age. Shaft is caved. Hoist house, compressor shed, and headframe remained on property in September 1954. In addition to the shaft there are several open cuts. Idle. Produced a small tonnage of ore between 1937 and 1948 which averaged about 0.25 ounces of gold and 0.1 ounces of silver per ton.
	Mildred and Abbie	Rudolph Vlasich, Box 69, El Portal	30	3S	19E	MD	Unpatented property consisting of one lode and one placer claim.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Miles						See Burr.
	Miners Hope						See Spread Eagle group.
	Mispah						See Last Chance II.
	Missouri Gulch	Not determined; former Las Mariposas Grant mine.	14	5S	18E	MD	A small working last active in 1903 when 7.33 tons of ore were mined that yielded $54.88 or an average of $7.48 per ton (Laizure 28:98).
162	Mockingbird I (Talc, Lacy)	David W. and Maxie S. Dukes, 612 Blackburn, Watsonville	27	4S	18E	MD	Located 1 mile south of Colorado School and 5½ miles, airline, northeast of Mariposa. Patented property consisting of 20 acres (Preston 90:304; Storms 96:219; Lowell 16:588; Castello 21:126; Laizure 28:101; herein).
	Mocking Bird II	Not determined; former Las Mariposas Grant mine.	30	5S	18E	MD	At the foot of Mocking Bird Ridge in Guadeloupe Valley. Under the lease to W. J. Howard and William Boldt. Last active between 1901 and 1908 producing 87.47 tons of ore yielding $2135 or an average of $24.42 per ton. Quartz vein in granitic rock (Logan 35:188; Eng. and Min. Jour. 1902, vol. 74, no. 5, p. 160).
163	Mohawk (North Whitlock Extension)	Alma Clark and Clyde Smith, c/o T. C. Smith, Route 1, Box 209, Bakersfield	31	4S	18E	MD	On the north extension of the same vein system that traverses the Whitlock and North Whitlock properties. Vein strikes north to N. 10° E.; dip ranges from 75° E to vertical. Wall rocks are greenstone. Vein has two branches, each ranging from a few inches to 2 feet in width. Worked prior to 1916 by G. L. Kennedy. Later by Nick Mullins (Castello 21:126-127). Produced a 1-ton pocket of ore in 1933 that yielded more than 9 oz. of gold.
	Monarch						See Spread Eagle group.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
164	Montara	Margaret I. Fisher and O. H. Knowlton, Sonora	30 31	2S	18E	MD	Adjoins the Marble Springs mine and was formerly worked by the Marble Springs Mining Company. See Marble Springs mine. Produced 62 tons of ore during the period 1931-33 which averaged about 0.6 ounces of gold and 1 ounce of silver per ton.
	Monte Christo group	Not determined	20	4S	20E	MD	In a tributary to Devils Gulch 4 miles east of the Cornett mine. According to Lowell (16:588-589) the vein is 6 feet wide and is developed by a 65-foot inclined shaft and several open cuts. Ore carries arsenopyrite and tetrahedrite as well as native gold.
165	Moonlight	R. W. Beals, A. W. Jackson, and C. Musson, 3700 Cutting Boulevard, Richmond	30 31	2S	18E	MD	On the North Fork of the Merced River just west of the Marble Springs mine. Accessible by jeep trail from Greeley Hill and the McDiermid Guard Station via the Bondurant mine road. Geology similar to Marble Springs mine. Undergoing development work in 1954 and 1955.
	Moonstone						See Clearinghouse.
	Moore Hill						See Arcturas.
166	Mormon Bar	Not determined; formerly part of Las Mariposas Grant	SE¼ 25	5S	18E	MD	Quartz vein a few inches to 4 feet wide strikes east and dips very gently north. Vein is accompanied by a dike of dark granitic rock. Vein matter is quartz with very finely divided gold and few or no sulfide minerals. Developed by an inclined shaft 120 feet deep (measured along the incline) with 200 feet of drifts on the 80-foot level, two underhand stopes and one raise. Last period of activity was 1933-34 when 160 tons were mined which ran 0.28 ounces of gold per ton (Laizure 35:38).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
167	Morning Star	Edith Trabucco, et al., Mariposa	11 12	4S	16E	MD	Patented property discovered prior to 1882. Owner in 1882 was Phil Gossar. Equipped with a 10-stamp mill. Sold for $16,000 in 1884 to a Mr. Rogers of San Francisco. In 1909, produced 100 tons of ore which yielded 62.98 ounces of gold and 10 ounces of silver (U. S. Bur. Mines records). Some development work was done in 1935 by J. H. Kelm of Bagby but there apparently was no production. Workings were caved and inaccessible in September 1954. Quartz vein strikes northeast, dip not observed. Wall rocks are massive pyroxene andesite agglomerate greenstones belonging to the Upper Jurassic Amador group. Vein matter is brecciated quartz carrying conspicuous pyrite. Workings consist of a crosscut adit at least 100 feet long driven N. 50° W. and with at least 100 feet of drifts. According to Wilkinson (04:12) there was once a 200-foot inclined shaft. (See also Laizure 35:38.)
	Mount Belle group		25	5S	17E	MD	A group of claims which included the Artru or Dorothy, White Oak, Blue Quartz and Champion mines. These were controlled by Belle McCord Roberts and the Consolidated Gold Fields of Mariposa in 1927, but since have been broken up into separate properties under multiple ownerships. (See Artru and Champion.)
168	Mount Buckingham (Vanderbilt, Sunset III)	Helen M. Ketler et al., 3325 Kempton Avenue, Oakland	1,2 11 12	5S	19E	MD	Near southeast end of Mt. Buckingham above Snow Creek 1 mile west of Darrah (Storms 94:176; 96:223; Wilkinson 04:13; Lowell 16:589; Castello 21:127; Laizure 28:102; herein).
169	Mount Gaines	J. W. Radil, 444 California Street, San Francisco	35 36	4S	16E	MD	On a tributary to Burns Creek 4½ airline miles northeast of Hornitos (Storms 96:221; Wilkinson 04:12; Lowell 16:589; Castello 21:128; Laizure 28:103; 35:39; Julihn and Horton 40:121-125; herein).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
170	Mount Ophir	Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	12	5S	18E	MD	One mile northwest of Mount Bullion close to the south side of Highway 49 (Browne 68:29,30; Storms 94:173; 96:221; Wilkinson 04:12; Lowell 16:590; Castello 21: 128; Laizure 28:98, 103; 35:37; Julihn and Horton 40: 111-112; herein).
	Mountain Belle	Not determined	NE¼ 25	5S	17E	MD	Located 7½ miles west of Mariposa and a quarter of a mile south of State Highway 140. Either the same as or adjacent to the Sorrel (Sarle) mine. Last worked in 1908. Quartz vein averages 3 feet in width between quartz porphyry walls. Workings originally consisted of a 174-foot inclined shaft and 100 feet of drifts on two levels (Lowell 16:589).
171	Mountain King	J. W. Radil, 444 California Street, San Francisco 4.	31 6	3S 4S	18E 18E	MD MD	On the north side of Merced River Canyon 1 mile east of Quartz Mountain and 6 miles east of Bagley. Patented (Wilkinson 04:12; Van Norden 17:698-703; Castello 21: 129; 28:102; herein).
172	Mountain Queen, Mount Queen)	Pete Mulas and Gus Schwing, Mariposa	29	4S	18E	MD	Close to Sherlock Creek east of the Sultana and Spread Eagle groups of mines. Adjoins and partially overlaps the W.Y.O.D. claim of the Diltz mine. Quartz vein 2 feet wide in greenstone. Workings in 1916 consisted of three shafts 85, 60, and 45 feet deep respectively. Idle except for assessment work (Lowell 16:591).
173	Mountain View I	Mariposa Commercial and Mining Company,	11.	5S	17E	MD	Located 2 miles northwest of Mount Bullion. Adjoins Louis mine on the northwest (Lowell 16:591; Laizure

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mountain View I (continued)	c/o Eileen Milburn, Mariposa					28:102; Logan 35:188; herein).
174	Mountain View II	Mrs. Adeline Giusto, Box 25, Altaville	20 or 29	3S	17E	MD	One of Flyaway group of mines at the head of Flyaway Gulch near the Schilling Ranch, $6\frac{1}{2}$ airline miles southeast of Coulterville. Discovery and assessment work only--no extensive workings. Geology similar to Big Lode and other mines of Flyaway district. See Big Lode.
	Mountain View III						See Early.
175	Nellie Kaho	Harold Hanson, Mariposa; under lease to Harmon and Gault (1956)	4 33	5S 4S	17E 17E	MD MD	Three miles south of Bear Valley just west of Cow and Calf Road (Julihn and Horton 40:125-126; herein).
176	New Years I	Not determined	29	3S	15E	MD	Located $8\frac{1}{2}$ miles north of Merced Falls on Webb Station-Hayward road. Quartz vein 2 to 4 feet wide strikes northwest and dips very steeply east. Drift adit 150 feet long has been driven on footwall side in hydrothermally altered, massive greenstone. No data on production available, but little or no stoping has been done. Idle in 1955.
	New Years II						See Barrett under Copper.
	Nighthawk						See Elizabeth.
177	Ninety Four						See Malvina group.
	North Fork						See Diana.
178	North Star and Oro Grande						See Gypsy.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
179	North Whitlock	Nettie M. Miller, 106 Lexington Avenue, Redwood City	SW$\frac{1}{4}$ 32	4S	18E	MD	Patented property consisting of 20.51 acres. Whitlock vein strikes north to N. 10° E. Dip is 75° E. to vertical. Vein matter chiefly milky quartz with native gold and auriferous pyrite. Greenstone wall rocks include flow lava, agglomerate, and intrusive pyroxene andesite porphyry. An old tunnel, open for 400 feet, starts on North Whitlock property, ends at boundary of adjoining Whitlock claim. Above tunnel is second adit, 40 feet long, and 100-foot nearly vertical shaft, the principal active workings. Mill includes a jaw-crusher, ball-race mill, two flotation cells and amalgamation barrel. Under lease to Tom Grunewald of Mariposa (August 1954).
180	Number One (Martin Quartz)	Not determined	34, 35	4S	16E	MD	Property consists of one unpatented claim located in 1875 Operated intermittently 1896-1917. Quartz vein averages about 3 feet in width, strikes northwest and dips 43° SW. Greenstone and schistose metavolcanic wall rocks. Principal working in 1914 was a 360-foot shaft with three levels, 1150 feet of drifts, and a 130-foot crosscut. Once equipped with a 10-stamp mill (Lowell 16:591-92; Castello 21:130; Laizure 28:105).
	North Whitlock Extension						See Mohawk.
181	Number Five (Monte Carlo)	Not determined	2,11	5S	16E	MD	Located 5 miles northeast of Hornitos and 1 mile northeast of the Number Nine mine (Lowell 16:592; Castello 21:130; Laizure 28:104; herein).
182	Number Eight	Not determined	10	5S	16E	MD	Half a mile west of the Number Nine mine. Quartz vein 3 to 6 feet wide strikes N. 25-30° W. and dips 65-70° SW. Wall rocks are quartz-mica schist and schistose granitic rock, probably altered granodiorite. Main vein has two shafts about 300 feet apart. All workings flooded. Inactive in September 1954.
183	Number Nine (Yosemite, Ginaca, Bill Jones, and McCall)	W.R. Plunkett and U.M. Peyrellade, 1278-26th Avenue, Oakland	10	5S	16E	MD	Located 2 airline miles northeast of Hornitos. Patented property of more than 50 acres (Storms 94:173; 96:221; Castello 21:130; Laizure 28:104; herein).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
184	Nutmeg	Sam Le Barry, c/o Permit Mining Company, Midpines	30	4S	18E	MD	On Whitlock Creek 4 airlines miles northeast of Mount Bullion and 1 mile north of the Permit mine (Julihn and Horton 40:152; herein).
185	Oakes and Reese (Grand Prize and Badger)	W. A. Hayes, Martin S. Heller, and J. P. Warren, 1900 Leimert Boulevard, Oakland 2	4 32 33	4S 3S	16E 16E	MD MD	Patented property of 26.15 acres in the northwestern part of Hunter Valley 2 miles east of Exchequer reservoir on Temperance Creek. (Browne 68:30-31; Raymond 10:23-24; Castello 21:131; Laizure 28:106; Julihn and Horton 40:117-119; herein.)
	Oak Springs	Not determined; former Las Mariposas Grant mine	9	5S	18E	MD	Located 2½ miles east of Mount Bullion, close to the south side of Highway 49. Quartz vein strikes N. 60-65° W. and dips steeply east on or close to the contact between schists of the Paleozoic Calaveras group and serpentine. Last active 1900-06, producing 74.81 tons of ore yielding $1689.80 or $22.60 per ton (Laizure 28:98).
186	Odell group	Not determined	14	4S	17E	MD	Property consists of a group of six claims located 1500 feet above the Merced River near the confluence of Sherlock Creek and the Merced River. Discovered in 1924. Two crosscut adits were driven between 1924 and 1928, the upper 80 feet long and the lower 175 feet long. Upper adit cuts two veins 35 and 70 feet from the portal, respectively. The lower adit intersects the veins 55 feet and 135 feet from the protal. Some specimen ore was found in the 18-inch front vein and lower-grade ore in the 3-foot rear vein (Laizure 28:106). Idle.
	Oiler						See Dolman.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
187	Old Timer	Herman L. Bullard and Thomas M. Fagan, Incline	NE$\frac{1}{4}$ 16	3S	19E	MD	Adjoins the Clearinghouse mine on the northwest, half a mile north of the Merced River and Highway 140 at Clearinghouse. Old Timer vein strikes N. 10-20° W. and dips 45-50° NE, 2 to 3 feet wide. Vein matter is milky quartz with pyrite, chalcopyrite and native gold. Wall rocks are hornblende quartz diorite, black quartz-biotite hornfels and mixed, injected contact rocks. Vein at surface is near the contact between metasediments and a granitic intrusion. Ore taken out during development was averaging $10 per ton with some assays running as high as $70 per ton. Only working is a short crosscut tunnel striking N. 55° E. with short northwest and southeast drifts. Strike of metamorphic rocks near the mine is N. 20-25° W. A relatively new working active in 1954-55.
188	Old Timers Club	Ray R. and Mary L. Scott, Mariposa	S$\frac{1}{2}$ 15	4S	19E	MD	Unpatented property consisting of 10 acres, 1$\frac{1}{2}$ miles north of Jerseydale.
	Old Wilcox						See White Oak and Wilcox.
	Onyx	Not determined	10	6S	17E	MD	Close to Highway 140 near Cathay. Quartz vein 3 feet wide strikes northwest and dips very steeply southwest between walls of granitic rock. Vein matter is milky quartz, pyrite, and native gold. Vein is traceable for 1$\frac{1}{2}$ miles. Workings consist of a 60-foot shaft and open cuts. Idle in 1954. Last operators were L. H. Rowland and S. B. Givens of Cathay (1927).
189	Orange Blossom (Cavagnaro)	Mrs. Charles B. Cavagnaro, Hornitos	NE$\frac{1}{4}$ 21	4S	16E	MD	Located 5$\frac{1}{2}$ airline miles northeast of Hornitos. Accessible from the Hornitos-Bear Valley road via the Silver Lead mine. A pocket mine located near the contact between contact-altered slate of the Mariposa formation and massive greenstone. Produced $18,000 in 1933-34.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Orange Blossom (continued)						including 2 pockets containing $4000 each (Laizure 35:39). Last operated in 1935 by H. A. McKenzie of Hornitos. Idle in 1954.
	Original						See Clearinghouse.
	Oro Grande						See Gypsy.
190	Oro Rico (Penon Blanco)	Oro Rico Mines Company, c/o A. D. Vencile, Room 14, 1584 West Washington Boulevard, Los Angeles	19 20 29	2S	16E	MD	Located 2 miles northwest of Coulterville on Highway 49. Property includes the Old Judge, South Judge, Little Judge, Penon Blanco, North Penon Blanco, and Star lode claims, a total of more than 100 acres. (Browne 68:35; Fairbanks 90:43; Storms 96:221; Lowell 16:493; Castello 21:132; Laizure 28:109; 35:40; Logan 35:135-136; herein.)
191	Ortega	Frank A. Cassacia, Mariposa	24 19	5S 5S	18E 17E	MD MD	Located 8 miles west of Mariposa astride Highway 140. Adjoins the Sorrel (Sarle) mine (Laizure 35:37; Julihn and Horton 40:131-133; herein).
192	Oso	Not determined; former Las Mariposas Grant mine	20	4S	17E	MD	In Oso Gulch half a mile west and slightly south of Bear Valley. Northwest-striking shear zone in slate. Ore occurs in a thin sheet of talcose material probably derived from serpentine. According to Browne(68:29) about $400,000 was taken from a shaft 50 feet deep and 7 feet wide. Last active in 1906, producing 7.85 tons of ore yielding $164.02 or an average of $20.91 per ton (Laizure 28:98).
193	Our Chance (Clark Mines, Albert Austin group)	Not determined	29	4S	18E	MD	On Sherlock Creek 4 airline miles northeast of Mount Bullion. Adjoins the Diltz mine on the west. (Lowell 16:576; Castello 21:106; Laizure 28:79; Julihn and Horton 40:147-148; herein.)

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Oyler Lode						See Dolman.
	P and L	Ray W. Cokeley, 415 Hillside Crest, Piedmont 11	21 or 28	3S	20E	MD	Located $2\frac{1}{2}$ miles south of El Portal.
	Paines shaft	Not determined; former Las Mariposas Grant mine	24	5S	18E	MD	Near the east border of the town of Mariposa in the vicinity of the Mariposa mine. Probably a minor working on the Powell vein. Active 1910-14 producing 1324.75 tons of ore yielding $7551.52 or an average of $5.71 per ton at the old price of gold (Laizure 28: table facing p. 98).
	Patricia and Charles						See Juniper.
194	Pendola Garden	Not determined; formerly Las Mariposas Grant mine	10	5S	17E	MD	On Cow and Calf Creek $3\frac{1}{2}$ airline miles west and slightly north of Mount Bullion. Quartz vein strikes northwest. Slate wall rocks. Active in 1908 producing 17 tons of ore yielding $278.58 or an average of $16.40 per ton at the old price of gold. Small production in 1949-50 (Laizure 28:98).
	Penobscott						See Crystal.
	Penon Blanco						See Oro Rico.
195	Permit (Boulder, Kockel, Bulldog, Bullpup)	Permit Mining Company, c/o H. H. Odgers, Midpines	23 31	4S	18E	MD	On Whitlock Creek 6 miles north of Mariposa or 3 airline miles northeast of Mount Bullion (Wilkinson 04:10; Lowell 16:578; Castello 21:109; Laizure 28:110; 35:40; herein).
	Perrin and Craigue						See Rutherford and Cranberry.
	Pete Gordon						See Little Bear and Little Bear Extension.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Phoebe	Not determined; former Las Mariposas Grant mine.	18	5S	18E	MD	A small working probably on the Childs vein on the northeast quarter of the section. Last active in 1908 producing 130 tons of ore from which $272.58 in gold was extracted, or an average of $2.10 per ton (Laizure 28: table facing p. 28).
	Piedra de Goza						See Roma.
	Pine Cone (Bald Mountain)	Not determined		4S	16E	MD	Small production from pockets in 1930 by F. A. Cavagnaro, Hornitos. Multiple quartz vein $2\frac{1}{2}$ feet wide (Laizure 28:110).
	Pine **Crest**						See Challenge, Pine Crest, and Pine Crest Extension.
	Pine Crest Extension						See Challenge, Pine Crest, and Pine Crest Extension.
196 196A	Pine Tree and Josephine	Pacific Mining Company, 1022 Crocker, Building, San Francisco	8,9 16 17	4S	17E	MD	Located 2 miles north of Bear Valley on Highway 49. (Browne 68:29; Raymond 70:23, 24; Fairbanks 90:35-36; Storms 94:173-175; 00:143; Wilkinson 04:11, 12; Lowell 16:594; Castello 21:133; Laizure 28:110; Knopf 29:83-84; Logan 35:186-189; Laizure 35:40-41; Julihn and Horton 40:107-110; Bradley 54:21, 32; herein.)
	Pioneer						See Argo.
197	Pittsburg Landing	Frank B. Ewing, Mariposa	8	5S	18E	MD	A patented property containing 33 acres located $1\frac{1}{2}$ miles east of Mount Bullion in vicinity of King Midas mine. Pocket mine in talcose serpentine. Former Las Mariposas Grant mine.
	Platinum King	C. F. Kingery, 847 Nineteenth Street, Merced	31	3S	17E	MD	Unpatented property consisting of five claims, the Platinum King, Platinum King Extension, Platinum Queen, and Inspiration claims. Pocket gold mine in greenstone. No platinum has ever been recovered.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Poole (Poole Track)	Not determined	10	5S	16E	MD	Discovered about 1872 by former state assemblyman D. M. Poole who pounded out several thousand dollars worth of gold with a hand mortar at the discovery site. Worked by Poole during the 1870's and by Live Oak Mining and Milling Company during the 1880's. Last work known to authors was done in 1909. Once equipped with an eight-stamp mill. Vein 3 to 6 feet wide strikes approximately north and is nearly vertical. Vein matter milky quartz with abundant pyrite with free gold chiefly in the oxidized zone. Much of the ore ran $4 to $50 per ton at the old price of gold. The principal working is a 150-foot shaft with considerable drifting on several levels. (Min. and Sci. Press, numerous entries 1872 to 1889.)
	Poole Track						See Poole.
	Porphyry Hill	Not determined; former Las Mariposas Grant mine.	20	5S	18E	MD	Close to Agua Fria Creek, 2 miles southeast of Mount Bullion. Workings not identified in 1954-55. Active 1901, 1905, 1907-10, producing 37.97 tons of ore yielding $2164.48 or an average of $57.09 per ton (Laizure 28: table facing p. 98).
198	Potosi						See Malvina group.
	Prescott						See Badger.
	Priest and Coleman						See Hite.
199	Princeton, New Princeton, and Princeton Extension	Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	13 18	5S	18E	MD	On the southern outskirts of Mount Bullion. Formerly part of Las Mariposas Grant (Browne 67:41-42; 68:29-31; Raymond 71:30-31; Fairbanks 90:33; Storms 00:143; Lowell 16:594; Laizure 28: table facing p. 98; Knopf 29:84-85; Logan 35:189; Julihn and Horton 40:113-116; herein).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	LOCATION T.	LOCATION R.	LOCATION B & M	REMARKS
	Pumkin						See Black Hill.
200	Pyramid (Castagnetto I)	Lloyd A. Mason, Hornitos	14,15 23	4S	16E	MD	In Hunter valley close to the west bank of Cotton Creek (Castello 20:110; Laizure 28:83; Julihn and Horton 40:120-121; herein).
201	Quail (Alvina, Hartford)	H. E. Moerlien, San Martin	15 16	3S	17E	MD	In Indian Gulch 6 miles southeast of Greeley Hill or 3 miles southeast of Dogtown. Includes four patented and seven unpatented claims, about 380 acres (Storms 94:175; Lowell 16:595; Castello 21:134; Laizure 28:112; 35: 42, 46; Julihn and Horton 40:141; herein).
202	Quartzburg group (Argonant, Columbia, Democrat, Spring)	Quartzburg Mining Company, c/o Peter H. Thurbon, 2554 - 21st Street, San Pablo	32	3S	16E	MD	In the northwest part of Hunter Valley, about 8½ airline miles north of Hornitos. Four unpatented claims. Country rock is greenstone. Quartz vein strikes northwest and dips east, developed by incline shaft now caved. Equipment has been removed but headframe and several buildings remain. Evidently mine has been closed for many years. (This property may be confused with another Quartzburg group in sec. 32, T. 4 S., R. 16 E., about 2½ miles north of Hornitos.)
	Quartz Mountain	Not determined	21	5S	16E	MD	Approximately 2 miles southeast of Hornitos and about a quarter of a mile southeast of the Duncan and Martinez mines. Discovered in September 1867 by Mexicans who took out a $3000 pocket. Worked in 1880's by Webber and Rogers, and by Branson. Purchased in 1896 by S. W. Parker of New York (Hornitos Gold Mining Company). Last development work was done about 1917. Ore was high in sulfides and much of it was low grade. Quartz vein strikes northwest and dips steeply northeast. Principal working is a southwest-trending adit with

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Quartz Mountain (continued)						connecting drifts and stopes. Wall rocks are slate, spotted slate, and schist and hornfels of Upper Jurassic age (Storms 94:175; 96:222. Also numerous entries in Min. and Sci. Press).
	Queen Saxon						See Mebold I group.
203	Queen Specimen	Pacific Mining Company, 1022 Crocker Building, San Francisco	8	4S	17E	MD	On Highway 49 one fourth of a mile northwest of the Pine Tree mine mill or 3 miles north of Bear Valley (Laizure 28:112, 188; Knopf 29:84; Logan 35:188; Julihn and Horton 40:fig. 44 facing p. 108; herein).
	Recorder						See Rex.
204	Red Bank (Stevenson group)	Percy L. Pettigrew, Box 639, Palo Alto, and Horace Meyer, Cathay	36	3S	16E	MD	On the north bank of the Merced River $1\frac{1}{2}$ miles northwest of Bagby (Storms 96:223; Castello 21:135; Laizure 28:113; 35:43; herein).
205	Red Cloud I (Kate Kearney)	Carl Harper, Coulterville	22 27	2S	17E	MD	Located $3\frac{1}{2}$ miles east of Greeley Hill (Goodyear 88:345; Storms 94:175; Castello 21:135; Laizure 28:113; 35:43; herein).
	Red Cloud II						See Blue Moon, under Zinc and Washington, under Gold.
	Red Oak						See Live Oak and Governor.
	Reed	Not determined	6	3S	18E	MD	On the North Fork of the Merced River near the head of the Bandarita ditch. Quartz vein 6 to 14 inches thick cuts slate and massive hornfelsic claystone and siltstone. Equipped with a Huntington mill. Has produced between $10,000 and $15,000 (McLean, Walter, personal communication, 1956).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
206	Reeds Flat	Not determined; former Las Mariposas Grant mine	21	4S	17E	MD	Located half a mile east of Bear Valley. Pockets and small shoots of ore occur in serpentine. Between 1909 and 1913 some 243 tons of ore was mined by lessees which yielded $4,191 or an average of $17.22 per ton at the old price of gold (Laizure 28: table facing p. 98). Last active 1938-39 producing 620 tons of ore and 50 tons of old tailings yielding 99 oz. of gold and 26 oz. of silver (U. S. Bur. Mines records).
	Regan						See Golden Key group.
	Revel						See Early.
207	Rex (Recorder, Rumley)	Charles M. Schroeder, et al., Box 169, Mariposa	20	4S	18E	MD	West of Saxon Creek near the Mebold mine. Pocket mine in greenstone. Rumley vein varies from 4 inches to 18 inches in width, strikes north and dips 30° E. Another north-striking, west-dipping vein 2 inches to 2 feet wide was encountered in running a crosscut that does not show at the surface. This vein produced high-grade pockets in 1928 when Robert MacLean of Mariposa recovered as much as $200 per day from ore broken in a hand mortar (Laizure 28:113). Between 1924 and 1938 the mine produced 63 tons of high grade ore yielding 233.95 ounces of gold and 34 ounces of silver (U. S. Bur. Mines records).
208	Reynolds	Not determined; probably Mariposa Commercial and Mining Company, c/o Eileen Milburn, Mariposa	11	5S	17E	MD	Vein parallels the Mother Lode 500 feet northeast of the Mountain View mine. Active 1900, 1904, 1906, producing 168.6 tons of ore yielding $2117.95, or an average of $12.56 per ton at the old price of gold (Laizure 28: table facing p. 98). Wall rocks are Mariposa slate. Vein is probably part of the Mother Lode system, which is multiple in this vicinity.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	River Tunnel (continued)						average of 83 cents per ton (Laizure 28: chart facing p. 98; Julihn and Horton 40: fig. 44, facing p. 109).
	Robinson and Orr group	Not determined	21	4S	18E	MD	Between 1932 and 1936, Frank D. Robinson of Merced and N. P. Orr of Mariposa operated group of seven claims. A tunnel 700 feet long was driven which reached a depth of 200 feet below the surface and a short crosscut was run. Gold occurs in quartz stringers in a quartz porphyry dike associated with graphitic and talcose schist. The dike strikes northwest and is almost vertical. (Laizure 35: 43.)
211	Roma (Piedra de Goza)	Frank Harris and Nellie Harris, 595 Tunnel Avenue, San Francisco 24	14	4S	18E	MD	A patented property of 25 acres close to the Yosemite All-Year Highway, 1½ miles south and slightly east of Briceburg (Storms 00:146; Lowell 16:596; Castello 21: 136; Laizure 28:113; herein).
	Roosevelt	Not determined	9	5S	18E	MD	Workings were not identifiable by the authors. Section 9 is underlain by greenstone and serpentine. Mine was last know to be active in 1905-06, producing 14.3 tons of ore yielding $159.60 or an average of $11.17 per ton. (Laizure 28: chart facing p. 98).
212	Rose	Not determined; former Las Mariposas Grant mine	8	5S	18E	MD	East of Highway 49 one mile east of Mount Bullion. Adjoins King Midas mine on the southeast and geology is similar. See King Midas.
	Royal group						See Sultana group.
	Rumley						See Rex.
213	Ruth Pierce (Amelia, Grimshaw)	Tennessee Gold Mining Company, c/o Pete Jericoff, 1219 Rhode	13	5S	16E	MD	On the Mount Bullion-Hornitos road 4 miles east of Hornitos (Lowell 16:596; Castello 21:136; Boalich 22: 365; Laizure 28:114; 35:43; Julihn and Horton

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Ruth Pierce (continued)	Island Street, San Francisco 10					40:126-127; herein).
214 214A	Rutherford and Cranberry (Perrin and Craigue)	L. J. Goodrich, 1522 State Street, Santa Barbara, owns one partial claim of 10.34 acres. Ownership of other claims not determined.	15 22	3S	19E	MD	On the Merced River close to Highway 140 about 4 miles west of El Portal (Goodyear 88:348; Storms 96:217; Lowell 16:580, 596; Castello 21:112, 136; Laizure 28:114; 35:43; herein).
	St. Gabriel and Honeycomb						See Silver Lead.
	St. Marys	Not determined	SE$\frac{1}{4}$ 29	5S	16E	MD	Located 1 mile southwest of Doss mine on the Hornitos-Indian Gulch road. Northwest-trending, northeast-dipping quartz vein in dark slate and schist of Upper Jurassic age. Principal working is a shaft with connecting short laterals. Idle.
	San Domingo						See Buffalo.
215	Santa Clara	Myrnie Koepp, Midpines	25	4S	18E	MD	A patented property containing 21 acres west of Highway 140 and half a mile south of Bear Creek Lodge. Quartz vein strikes N. 55° W. in greenstone wall rocks. In 1896 workings consisted of a 60-foot inclined shaft and a 100-foot tunnel (Storms 96:222).
216	Santa Rosa	Not determined	25	4S	18E	MD	Apparently adjoins the Santa Clara mine and is on the same ore zone. An old mine with extensive workings prior to 1895. Worked intermittently from 1895 to 1911 by R. B. Stockton of Madera. Small production from pockets 1911, 1926, 1929-34. Had 10-stamp mill built in 1895. Stockton and Eckter of Madera milled considerable

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Santa Rosa (continued)						ore between 1934 and 1936 that ran $7.50 per ton exclusive of pockets of high-grade ore. Ore occurs in a nearly vertical stringer zone striking N. 55° W. Zone is cut by numerous cross veins or cutters some of which carry ore. Workings in 1935 consisted of a 200-foot adit, a 100-foot adit and three shafts, 35, 50, and 50 feet deep, respectively. Ore zone is 7 to 20 feet wide (Laizure 35:43).
	Sarle						See Sorrel.
	Saxon King and Saxon Queen						See Mebold I.
	Schlageter						See Golden Gate group.
217	Schoolhouse	Frank A. Maschio and John Maschio, Merced, and Joe Maschio, Snelling	10	4S	16E	MD	A patented property in central Hunter Valley 7 airline miles northeast of Hornitos (Castello 21:737; Laizure 28:115; herein).
218	Schroeder group	C. M. and R. F. Schroeder, Box 169, Mariposa	16	4S	18E	MD	On high ground west of Saxon Creek Canyon 3 airline miles northwest of Colorado School (Storms 96:223; Lowell 16:596, 600; Castello 21:137; Laizure 28:115, 127; 31:44; herein).
	Scorpion	Not determined; former Las Mariposas Grant mine.	20	4S	17E	MD	Close to Bear Valley on the west. Active under lease from Las Mariposas Grant in 1902, producing 46.74 tons of ore yielding $341.21 or an average of $7.30 per ton. No further information was available and the workings could not be identified (Laizure 28: chart facing p. 98).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sebastopol	Not determined	32	5S	19E	MD	Located 1$\frac{1}{2}$ miles southwest of Bootjack. According to Laizure (28:116) there is a well-developed quartz vein prospected by surface cuts and several adits. A report by Techow and Davis of Sacramento listed sample assays ranging from $1.65 to $5.60 per ton. U. S. Bureau of Mines records show a small production in 1926 and 1927 and for the period 1936-41. The property was not visited during this investigation. Wilkinson (04:16) describes it as a pocket line on a 4-foot quartz vein striking north and dipping 40° S. Gneiss walls. He indicates presence of a 100-foot shaft. Owner 1904-27 was L. L. Hart of Mariposa. Belle McCord Roberts of Long Beach purchased the mine in 1927 (Laizure 28:116).
	Senaca						See Doss.
	Shimer						See Lovely Rodgers.
219	Sierra Rica	J. W. Graham and Amelia Wilson, 1090 Carolyn Avenue, San Jose	14	4S	18E	MD	Just east of Highway 140 three airline miles northwest of Midpines in the vicinity of the King Solomon, Roma, and Lena Farber mines. Accessible by half a mile of trail from Highway 140. A patented fractional claim of 2.88 acres. Operated through most of its history in conjunction with the King Solomon or King Solomon and Roma mines. Early production reported to be $300,000. Had a very small recorded production in 1910 and some work was done on the mine in 1919 by lessees. According to Laizure (28:116) the vein averages 4 feet in width, strikes northeast and dips 70° SE between greenstone and slate walls. Workings in 1928 consisted of a 450-foot crosscut tunnel and a 125-foot raise with some drifts from both these workings. Not visited because of dense brush. Apparently idle many years (Wilkinson 04:13; Lowell 16:597; Castello 21:137; Laizure 28:116).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Silver Bar						See under Silver.
	Silver Lane						See under Silver.
220	Silver Lead (St. Gabriel and Honeycomb, Silver Lead and Margaretta)	E. G. Branson et al., c/o Horace Meyer, Cathay	28	4S	16E	MD	Located 4½ miles north and slightly east of Hornitos (Lowell 16:597; Castello 21:138; Boalich 23:365; Laizure 28:116-117; 35:45; herein).
221	Silver Right (Silver Cloud)	Annie L. Spence, 2242 Tasso Street, Palo Alto	19, 30	3S	17E	MD	Located 7 miles southeast of Coulterville. One of Fly-away group of mines. Patented property consisting of 18 acres. Lies between Alta and Sweetwater claims. Explored by several short tunnels and drifts. Quartz vein strikes N. 50° W. and dips 55°-60° NE. Vein is closely associated and parallel to a system of albitite and diorite dikes. Dike system generally divides greenstone and serpentine wall rocks. Property is not equipped. Idle.
	Simeon Landrum						See Landrum.
222	Simpson vein	Not determined; former Las Mariposas Grant mine	30	5S	18E	MD	Located 1½ miles south and slightly east of the Ortega and Sorrel mines on Highway 140, or 1-3/4 miles west of Guadeloupe Valley. In rugged country and adjacent to La Mineta Gulch. North-trending quartz vein in granitic wall rocks. Active 1902-03, producing 12.03 tons of ore yielding $317.42, or an average of $26.37 per ton (Laizure 28: chart facing p. 28).
	Sirocco						See Yellowstone.
223	Sorrel (Sarle)	Not determined; probably Frank A. Casaccia, Mariposa	NE cor. 25	5S	18E	MD	On Highway 140 just south of the Ortega mine and on the same vein system Active in 1909 under F. L. Wallingford who was operating a new mill (Eng. and Min. Jour., 1909, vol. 87, no. 15, p. 773). North-trending quartz vein in granitic rocks. Adjacent to the Ortega mine--see Ortega.
224	South Cranberry and South Cranberry Extension	Not determined	22	3S	19E	MD	Near the Merced River and Highway 140 about 4 miles west of El Portal. Adjoins Cranberry mine. See Rutherford and Cranberry. Not active recently. Owner (1927) was Helen Bass, 280 Union Street, San Francisco.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	South Side						See Georgia Point.
225	Southern Cross	Lena Giusto, Box 66, Angels Camp	29	3S	17E	MD	Patented property 20.38 acres, 8 miles southeast of Coulterville. One of Flyaway group of claims. Adjoins Bonanza claim on the east. Vein strikes N. 70° W. and dips northeast between greenstone walls. Gold occurs in pockets. Idle.
226	Specimen, Pershing, and Specimen Extension	Helmuth H. Lane, 128 North La Jolla Street, Los Angeles	35 36?	3S	16E	MD	Located $1\frac{1}{2}$ miles northwest of Bagby. Pocket mine in greenstone. Active in 1952 under E. J. Mariah of Mt. Bullion and J. E. Costa of Bear Valley. Produced a small tonnage of 3-oz. per ton ore. Temporarily idle in September 1955. Workings consist of a 60-foot shaft with 40 feet of drifts. Total production 1905-52 is about $12,000 realized from approximately 894 tons of ore or an average of about $13.42 per ton (U. S. Bur. Mines records).
227	Spencer	Leroy H. Dart et al., 28 Domingo Avenue, Berkeley	SW$\frac{1}{4}$ 29	4S	18E	MD	Whitlock district 4 miles north and slightly west of Mariposa. Patented property of 20 acres located parallel and close to the Sultana and Bald Eagle claims. Quartz vein averaging 3 feet in width strikes slightly west of north, and dips about 70° E. Wall rocks are massive to schistose, platy greenstone of unknown age. Discovered prior to 1883. In 1896 had a 480-foot drift adit, cutting pay shoots 45 and 55 feet long, respectively, and a 100-foot shaft, unusable (Storms 96:223). Lowell (16:597) identified workings consisting of a 150-foot working shaft, 150-foot airshaft, 500 feet of drifts, 220 feet of crosscuts, a 50-foot winze and a stope 350 feet long and 150 feet high. In 1927 the active workings were a 150-foot crosscut connecting with a 50-foot winze and a large stope (Laizure 28:117). The property was inactive and the workings were inaccessible

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Spencer (continued)						and difficult to identify in November 1955. A small production was recorded for the mine in 1898, 1900, and 1932.
228	Spread Eagle group (Empire, Farmers Hope, Miners Hope, Mohawk, Monarch, Tollgate, Bonanza II)	Mack C. Lake, c/o Carlo S. Morbio, 58 Sutter Street, San Francisco	29 31 32	4S	18E	MD	In the Whitlock district 4 miles north of Mariposa. A patented property including the Empire, Fanny, Miners Hope, Little Charlie, Mohawk, Monarch, Spread Eagle, and Tollgate claims, and the Empire millsite (Preston 90: 308; Lowell 16:582, 597; Castello 21:126; Laizure 28: 117; 35:38; Julihn and Horton 40:148-150; herein).
	Spring						See Quartzburg group.
	Spring Hill and Spring Extension						See Mountain King.
	Spring Tunnel						See Georgia Point.
	Squirrel						See Bunker Hill.
229	Standard	Dorothy Clough, 101 Salinas Road, Watsonville	33	4S	18E	MD	A patented property of 21 acres on Sherlock Creek southeast of the Diltz mine and near the Weston placer ground. Long inactive; workings were not identifiable to the authors.
	Star	Not determined	7	3S	18E	MD	Adjoins the Texas Hill mine and is on the west extension of the Carrie Todd vein. Main working is an adit level 150 to 200 feet long with several connecting winzes, but minor stoping only. Equipped with a 10-stamp mill 1890-1902 and there had been one mill previous to 1890. See Texas Hill mine.
	Stepping Stones						See Elizabeth.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Stevenson group						See Red Bank.
230	Stockton Creek and Stockton Creek Tunnel	Not determined; former Las Mariposas Grant mine.	24	5S	18E	MD	Half a mile east and slightly south of Mariposa. Adjoins the Mariposa mine on the southeast. Discovered in the 1850's. Worked intermittently up to 1938. Principal recorded production was between 1900 and 1915 during which time 632.98 tons of ore was mined which yielded \$11,996.94 or an average of \$18.95 per ton. (Laizure 28: chart facing p. 98.) There are two veins, each about 2½ feet wide. Vein most extensively worked, believed to be an extension of the Mariposa vein, strikes about N. 65° W. and dips 45° SW. Workings in 1928 (Laizure p. 118) consisted of a 135-foot inclined shaft with two levels. Upper level has 250 feet of drifts and the lower level 300 feet of drifts. There is also a stope 3 feet wide, 100 feet long and 70 feet high, presumably driven from the first level (Lowell 14:598; Castello 21:139; Laizure 28:98).
	Stud Horse Flat group						See Live Oak and Governor.
	Succeedo						See River Tunnel and Queen Specimen.
	Sultan						See Sultana group.
231	Sultana group (Royal group, Bald Eagle, Sultan, Sultana, and Sultana Extension)	Thomas E. Faxon and Thomas M. Bains III, Mariposa	29 32	4S	18E	MD	A patented property containing 45.86 acres east of Whitlock Creek and 4 airline miles north and slightly west of Mariposa. Includes Sultan, Sultana Extension, Sultana, and Bald Eagle fractional claims. Operated prior to 1914 by Tresidder, Bains, and Tresidder. Sultana vein trends north and dips 45-60° E. In the Sultana Extension claim several east-trending cutter veins which dip moderately south cross the Sultana vein. The Sultana vein ranges from a few inches to about 18 inches

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Sultana group (continued)						in width. Wall rocks are massive pyroxene andesite greenstone of unknown age. Developed by a shaft 75 feet deep serving 200 feet of drifts and connected by a drift to a 30-foot deep winze. A small production was recorded in 1936 but the property has been largely idle for several years except for assessment work. The Sultan claim was recently patented, the last claim in the group to achieve this status. Mr. Bains lives on the property (Lowell 16:596). The mine adjoins the Spread Eagle vein on the east.
232	Sunset I (Trujillo) group	Robert B. Trujillo, Route 3, Box 249, Merced	25	4S	16E	MD	At the headwaters of Burns Creek 5½ airline miles northeast of Hornitos. Accessible via the paved Bear Valley--Hornitos road and 1 mile of unimproved dirt road. Property consists of the unpatented Sunset, South Sunset Extension, La Venue, and Nacimiento del Oro. A pocket mine in greenstone of the Upper Jurassic Amador group. Produced high-grade ore in 1910-12, 1918, and 1933-39--a total of 757 tons from which 984 oz. of gold and 216 oz. of silver were extracted (U. S. Bur. Mines records). Ore has averaged nearly $27.00 per ton, mostly at the old price of gold.
	Sunset II						See Quail.
	Sunset III						See Mount Buckingham.
	Sunset IV						See Lena Farber and Sunset IV.
	Sunshine						See Martin-Walling.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
233	Sunshine group	Herbert D. Merrill, Mariposa	19 20	4S	18E	MD	On the northeast bank of Sherlock Creek across the canyon from the Golden Key mine. Accessible by Highway 49 and the graded Sherlock Creek road, 11 miles from Mariposa. Adjoins the claims of the Golden Key group. Most of the work on the property was done prior to 1914 when workings consisted of a 100-foot inclined shaft with 280 feet of drifts, a 100-foot raise, and a stope 140 feet long and 100 feet deep (Lowell 16:598). There is also a tunnel of unknown length driven west from the level of Sherlock Creek. There are several veins 1 to 3 feet wide on the property striking generally north and dipping moderately to steeply east. The mine has not been worked recently. Property consists of the Sunshine 1, 2 and 3 lode claims and the Yosemite placer.
234	Sweetwater I	Lena Guisto, Box 66, Angels Camp	29 30	3S	17E	MD	Part of a patented property consisting of 20.38 acres which includes the Southern Cross, Bonanza, and Sweetwater claims. These are all part of the Flyaway group of pocket claims located prior to the 1890's. Quartz vein is parallel to and closely associated with a series of albitite and diorite dikes striking N. 50° W. and dipping 55°-60° NE. Workings consist of several short tunnels and drifts. The dike series generally divides greenstone wall rocks to the east from serpentine wall rocks to the west. Mine is unequipped and idle (Sept. 1954).
235	Sweetwater II	Hudson River Gold Mines, Ltd., c/o H. Vanel, P.O. Box 76, San Rafael; under lease to Clyde Foster of Jerseydale.	17 20	4S	19E	MD	On the west side of Sweetwater Creek 2 airline miles northwest of Jerseydale (Castello 21:140; Laizure 28:118; 35:45; herein).

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
236	Talc (Lacy Cuneo)	Estate of Catharine Cuneo, 1011-22d Street, Merced	19	3S	17E	MD	Located 7 miles southeast of Coulterville at head of Flyaway Gulch. One of the Flyaway group of claims. Patented property consists of 20 acres. Adjoins Alta claim on the west. Workings consist of several short tunnels and drifts and a few shallow open cuts. Vein strikes N. 60° W. and dips 50° NE. Occurs at contact of greenstone, on the northeast, and serpentine on the southwest. Unequipped and idle (Sept. 1954).
	Teats (Teets)						Same as Spread Eagle; see Spread Eagle group.
	Texas						See Texas Hill.
	Texas Gulch (Texas)	Not determined; formerly part of Las Mariposas Grant. Operated by Noel Coutts of Mount Bullion up to 1952.	19	5S	18E	MD	In Texas Gulch close to Highway 140 between Nigger Hill and the Ortega mine. Northwest-trending quartz vein in slate. Active 1902-03 producing 185.54 tons of ore yielding $2689.73 or an average of $14.51 per ton at the old price of gold. Produced about 1100 tons of low-grade ore between 1941 and 1952. Inactive in August 1955.
237	Texas Hill (Texas, Carrie Todd)	G. Ross Frank and Mary E. Shell, c/o W. J. Beatty, Coulterville	7,8	3S	18E	MD	In the Kinsley district 2 miles southwest of Kinsley guard station of U. S. Forest Service. Property includes one patented claim of 20.66 acres (Wilkinson 04: 10; Castello 21:109, Laizure 28:82,89; 35:45; herein).
	Thomas and Bousson	Not determined; former Las Mariposas Grant mine.	17	5S	18E	MD	Located 1 mile east of Mount Bullion, apparently one of several unidentified shallow workings in serpentine. Last active in 1903 producing 22.37 tons of ore yielding $240.65 or an average of $10.77 per ton at the old price of gold (Laizure 28: chart facing page 98).
	Thorn Extension						See Doss.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Tollgate						See Spread Eagle group.
238	Triumph	Mrs. G. C. Griffith, 427 Twenty-Fourth Street, Merced	29	4S	18E	MD	On Whitlock Creek west of the Spread Eagle group, 4 airline miles north of Mariposa. A north-trending, steeply east-dipping quartz vein cuts greenstone wall rocks. Developed by a 150-foot shaft. No recent activity.
	Trujillo group						See Sunset I.
239	Tulito	Arthur Giles, Hornitos	E½ SE¼ 29	5S	16E	MD	A patented property of 20 acres located 3 miles south of Hornitos near the head of Toledo Gulch. An old property long idle.
	Turner	Not determined; former Las Mariposas Grant Mine	24 29 30	5S 5S	17E 18E	MD MD	Active 1902-03, 1906, 1911, 1914-15 producing 309.56 tons of ore yielding $2904.51 or an average of 9.40 per ton. (Laizure 28: chart facing p. 98.) One of several workings in the vicinity of the Ortega and Sorrel mines astride Highway 140. See Ortega mine.
	Twin Springs						See Independence.
240	Tyro	Louise A. Ward and Laurence Eaton, P.O. Box 223, Ross, Marin County	9 10	3S	16E	MD	A patented property consisting of the Rittershoffen claims of 20.15 acres. Adjoins Malvina group on the south and is 1½ miles southwest of Coulterville (Fairbanks 90:39; Storms 94:176; 96:223; Lowell 16:598-599; Laizure 28:119; Logan 35:190; herein).
241	Uncle Jim, Uncle Jim No. 2, and Bear	Robert W. and Emma V. Landon, 2709 North Ontario Street, Burbank	20 29	3S	19E	MD	A patented property of 60 acres on Highway 140 at the confluence of the Merced River and its South Fork. Placered and ground sluiced in gold rush days. Still worked occasionally for both lode and placer gold. Quartz vein system trending northwest crosses the property. There is a short adit toward the south end of

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Uncle Jim, Uncle Jim No. 2, and Bear (continued)						the property and other shallow workings. Last recorded production was in 1936 (Laizure 28:119).
	Union and Summit	S.H.F. McGouran, Box 859, Auburn	17 or 21	4S	19E	MD	Adjoins or is in the vicinity of the Early mine.
242	Union Leader group	Jack G. Bell, Coulterville	24 25 19 30	2S 2S	18E 19E	MD MD	Two miles north and slightly west of Little Grizzly Mountain on Deer Flat. Accessible from the Kinsley-Briceburg road by way of the Bull Creek road. Last active in 1938-40 producing a moderate tonnage of ore averaging $20.60 per ton. Quartz vein 1 to 3 feet wide, strikes slightly west of north and dips 20-45° E.
	Vanderbilt						See Mount Buckingham.
243	Venture						See Mary Harrison group.
244	Violet	C. A. Rinde, 1020 Miller Avenue, Berkeley 8	Center 35	2S	17E	MD	A patented property of 40 acres 4½ miles southeast of Greeley Hill and 2 miles east of the McDiermid guard station of the U. S. Forest Service. Quartz vein 1 to 3 ft. wide strikes northeast and dips 45-50° NW. Wall rocks are slate and hornfelsic slate.
	W.Y.O.D.						See Diltz.
245	Virginia (Virginia-Belmont)	Sam E. Wells, 7533 Cecelia Avenue, Downey	13 14	3S	16E	MD	Just west of Highway 49 about 4 miles south of Coulterville. A patented property of 92 acres (Goodyear 90:41; Storms 96:224; Lowell 16:599; Castello 21:141; Laizure 28:119; 35:46; Logan 35:190; herein).
	Virginia-Belmont						See Virginia.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Walsh						See Bean Creek group.
246	Washington I (Jenny Lind, Red Cloud)	Mariposa Land Company, 1022 Crocker Building, 620 Market Street, San Francisco	4,5	5S	16E	MD	A patented property just north of the Hornitos-Bear Valley road $1\frac{1}{2}$ airline miles northeast of Hornitos or $2\frac{1}{2}$ miles by road (Storms 96:224; Castello 20:141-142; Laizure 28:138; herein).
	Washington II						See Buena Vista group.
	Washington-Buena Vista						See Buena Vista group.
	Watson vein	Not determined; former Las Mariposas Grant mine	4	5S	18E	MD	On the Whitlock Creek road near the French Camp mine 3 airline miles north of Mariposa. Active in 1903, 1905, and 1910 producing in that period 142 tons of ore yielding $1235.25 or an average of $8.69 per ton. Workings were not identifiable by the authors but there are several narrow, north-trending quartz veins in greenstone in that vicinity.
247	West Rutherford and W. R. Extension	Not determined	22	3S	19E	MD	Adjoins the Rutherford mine. On the north side of the Merced River and Highway 140 four miles west of El Portal. See Rutherford and Cranberry.
	Westward						See Whitlock group.
	Wet Branch	Not determined; former Las Mariposas Grant mine	17	5S	18E	MD	Located 1 mile east of Mount Bullion. One of several small workings is serpentine near Highway 49. Not distinguishable from other workings. Active in 1901 and 1908 producing 69.6 tons of ore yielding $432.50 or an average of $6.22 per ton (Laizure 28: chart facing p. 98).
	White Gulch						See Virginia.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
248	White Oak and White Oak Extension	Edward Y. Myers, Box 305, Mariposa	27 34	4S	18E	MD	In the Colorado district four-tenths of a mile south of Colorado School. Lies between the Landrum and Mocking Bird mines. Quartz vein 2 to 4 feet wide strikes N. 25-30° W. and dips 70-80° NE. Vein matter is bluish quartz showing abundant chalcopyrite and some pyrite, with occasional blebs of native gold. Vein is accompanied by thoroughly altered, clayey dike-rock. Veins crop out on an old erosion surface and the granitic country rock is deeply weathered. Mining has been badly hampered by caving ground. Workings consist of a 30-foot shaft, surmounted by a headframe and ore bin, and a second shaft 60 feet deep, partly caved. The extent of the lateral workings could not be determined. Ore is commonly high-grade but pockety and generally occurs where cutters strike the main vein.
	White Oak group						See Live Oak and Governor.
249	White Oak and Wilcox	Not determined	18	3S	19E	MD	Six miles northeast of Briceburg near the mouth of Miles Gulch. East of the old site of Yosemite Portland Cement Company's rock crusher and close to the Merced River and Highway 140. Quartz vein about 2 feet wide strikes north and dips 30° E. Wall rocks are slate and slaty limestone intruded by granitic rocks. Developed by a 450-foot adit near river level and several shallow shafts and short tunnels. (Lowell 16:593; Castello 21:142.)
250	White Porphyry group	Not determined; several of the northernmost workings are held by F. E. Ryberg of Coulterville	34	3S	17E	MD	In the Cat Town district 3 miles southeast of Buckhorn Peak or 7½ airline miles southeast of Coulterville. Discussed herein.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
251	White Quartz	Agnes McIver, et al., c/o E. F. Ducommun, 960 Avondale Road, San Marino	15	5S	16E	MD	Located $1\frac{1}{2}$ airline miles east and slightly north of Hornitos and half a mile southwest of the Number Nine mine. A series of parallel quartz veins strike N. 20-50° E. and dip 45-60° SE. Best developed veins have an average width of 2 feet and locally reach 4-5 feet. Wall rocks are quartz-mica schist and massive quartz-mica rock. There has been considerable stoping on three of the veins from pits, tunnels, and shallow shafts. Vein matter is milky quartz containing pyrite, chalcopyrite, bornite, and finely divided native gold. An inclined shaft of unknown depth is surmounted by an old wooden head frame. There was about 75 tons of ore on the dump in August 1954. This property was probably once part of the Number Nine holdings. There had been no recent activity in the summer of 1954. The patented property consists of 11.17 acres.
252	Whitlock group (Consolidated Whitlock and Alabama)	Dr. Frank E. Gallison, P.O. Box 491, Ventura, E. J. Freethy, 1432 Kearney Street, El Cerrito	32	4S	18E	MD	East of the Whitlock Creek road $3\frac{1}{2}$ airline miles northwest of Mariposa and $4\frac{1}{2}$ miles by graded dirt road from Mount Bullion on Highway 49 (Storms 94:176; 96:224; Lowell 16:599; Castello 21:142; Laizure 28:121; herein).
	Wildcat	Not determined; former Las Mariposas Grant mine	16	5S	17E	MD	A small working in the vicinity of the Princeton mine, long idle. Last active in 1908 producing 12.2 tons of ore yielding $132.86 or an average of $6.22 per ton at the old price of gold (Laizure 28: chart facing p. 98).
253	Williams Brothers (Gibbs)	Earl, Ray, Fred and G. H. Williams, El Portal, or Route 1, Box 1061 E, Modesto	31 32	3S	20E	MD	On the southeast slope of Browns Peak 3 miles south and 1 mile west of El Portal. Described herein.

LODE GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
254	Yellow Metal group	Berniece Jeffery Moss, Box T, Mariposa	16	4S	18E	MD	An unpatented property consisting of three claims, the North Yellow Metal, South Yellow Metal, and Dos Pinos, on Saxton Creek half a mile south of the Merced River and a fourth of a mile northeast of the Schroeder mine. Workings consist of an east-driven crosscut adit and several lesser drift adits. These were driven to strike a steeply dipping north-trending quartz vein cutting slaty metasediments of the Paleozoic Calaveras group. A modest production was recorded in the 1930's under the Yellow Metal Mining Company. This company also operated the White Oak mine near Colorado School for a time in the 1920's and early 1930's.
255	Yellowstone (Sirocco, Yellowstone-Sirocco)	Not determined	19	4S	17E	MD	Located 1½ miles west of Bear Valley just north of the Bear Valley-Hornitos road (Storms 94:195; 96:224; herein).
	Yellowstone Sirocco						See Yellowstone.
	Yosemite						See Number Nine.

PLACER GOLD

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
256	Agatha	Elsie R. Dovidio, 450 Jones Street, San Francisco	10	4S	18E	MD	On the Merced River at Briceburg. A patented property of 19 acres. Stream bottom and bench gravels were worked in the early days.
257	Ah Wai Drift	Not determined	29 32	4S	18E	MD	On the southwest side of Sherlock Creek half a mile southeast of the Diltz mine. Boulder-bearing bench gravel, probably Pleistocene. Developed by 2000 feet of ditches. Workings largely inaccessible in 1954. (Lowell 16:600.) Worked by John Hand and W. Weston during World War I period and there were extensive workings prior to that time.
258	Barker Corporation dredge grounds	Not determined	11 14	5S	16E	MD	Located $2\frac{1}{2}$ miles northeast of Hornitos. Company also operated dredges on properties in Hunter and Bear Valleys during the period 1940-42. Deposits yielded between 17 and 27 cents per yard and grossed over $1,000,000 during the above period (Averill 46:261).
259	Bennett-Pate and Baker dredge ground	Not determined	36 1,2 31	7S 8S 7S	16E 16E 17E	MD MD MD	On Mariposa Creek near the point of its debouchment onto the valley floor east of Planada. Close to the K. R. Nutting Company dredge ground. Drilled and sampled in 1934 by Walter C. Vaughn of San Francisco and found to be too low-grade to work by the available equipment (Laizure 35:46). Worked in 1936 by Placer Properties, Inc. of Oregon House, California. Several hundred thousand yards of material were processed that yielded 13 cents per cubic yard. The deposit was about 600 feet wide and 14 feet deep, mainly gravel and cobbles. Bedrock is greenstone, granite, and slate (for a description of the processing plant see Julihn and Horton 40: 160).
260	Big Chick	Mrs. Mabel E. Escobar, Coulterville (1950)	1	3S	16E	MD	On Maxwell Creek 2 miles east and slightly south of Coulville. Produced a small tonnage of material yielding

PLACER GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Big Chick (continued)						about 1.75 per ton in 1949-50 (U. S. Bur. Mines records).
261	Bull Creek	Not determined	4	3S	18E	MD	Close to the Briceburg-Kinsley-Coulterville road 1 mile north of Kinsley guard station of the U. S. Forest Service. Dredged in 1947.
262	Costa Placer	Ralph and Libbie Dailey, 1165 West 22nd Street, Merced	9 10	4S	16E	MD	In Hunter Valley half a mile west of the Schoolhouse mine. A patented property of 20 acres.
263	Crocker-Huffman Land and Water Company property	Not determined; probably Thurman Gold Dredging Company, 625 Market Street, San Francisco	8 (?)	5S	16E	MD	On Burns Creek near Hornitos, Operated 1941-42 by Thurman and Wright of San Francisco. Also active 1948-51. Between 1941 and 1951 about 4,843,109 yards of gravel were processed which yielded about $650,000 or an average of about 13.5 cents per cubic yard.
264	Fremont Placer	Pacific Mining Company, 1022 Crocker Building, San Francisco	6	4S	17E	MD	In Hell Hollow near its confluence with the Merced River at Bagby. A patented property of 8.15 acres worked prior to 1900.
265	Fremont Drifting and Mining Company property	George W. and Bessie Welch, Bagby	6	4S	17E	MD	On the Merced River at Bagby. A patented property of 43.68 acres. Worked prior to 1900.
266	Garden (Weston)	John Val and L. P. Pucinelli, Box 316, Angels Camp	33	4S	18E	MD	On Sherlock Creek 1½ miles southeast of the Diltz mine. A patented property of 20 acres. A contemporary stream deposit of gravel and sand without boulders. Considerable coarse gold was recovered. Worked during the early 1900's by W. D. Weston (Lowell 16:600).
	George Placer						See Early under Lode gold deposits.

PLACER GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
267	**Golden Eagle**	Gladys Telfer Brashears, P.O. Box 283, Clovis	3	5S	19E	MD	On Jones Creek 3 miles west of Darrah. A patented property of 60 acres. Gold probably derived from weathered upper parts of quartz veins in the vicinity. No recent activity.
268	Hanas Placer ground	Not determined	9	7S	17E	MD	On Mariposa Creek 2 airline miles northwest of White Rock silica mine. The ground extends 6000 feet along Mariposa Creek and is 9 to 25 feet deep, but the v-shaped canyon is very narrow and only a small area of the 40-acre tract is pay gravel. Bedrock is slate. Much of the gravel averages 50 cents per yard. So far as the authors have been able to determine only part of the gravel was worked by T.D. Hanas in 1938. See Julihn and Horton (40:162) for details of the washing equipment.
269	Huelsdonk Placer	Not determined	5,6	4S	15E	MD	On Browns Creek near the Butterfly mine. Some gold and a little platinum were produced by W. A. Huelsdonk in 1926.
270	Jones Flat Placer	Gladys Telfer Brashears, P.O. Box 283, Clovis	24	4S	15E	MD	On Jones Flat half a mile northwest of the Blue Moon mine or $5\frac{1}{2}$ miles, airline, northwest of Hornitos. Pleistocene bench gravels were worked in early days by hand methods and later by dragline dredge.
271	Jordan dredge ground	R. C. Jordan, Box 277, Ahwahnee (1950)	33 34	5S	19E	MD	On the West Fork of Chowchilla Creek half a mile south of Bootjack. Last worked in 1950 by Jordan.
272	Kockel Placer	Not determined	24	4S	17E	MD	On a tributary to Sherlock Creek $1\frac{1}{2}$ airline miles northwest of the Nutmeg mine. A few pounds of coarse gold nuggets were recovered in 1938 by Traugott Kockel. The largest nuggets weighed $1\frac{1}{2}$ oz. They were taken from the edge of a slide which had buried rich placer ground. (Julihn and Horton 40:162).

PLACER GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
273	Mariposa Sand and Gravel Company ground	Mariposa Sand and Gravel Company, Mariposa	25 36	5S	18E	MD	On Mariposa Creek opposite the fair grounds, $1\frac{1}{2}$ miles south of Mariposa. Small production of by-product gold and silver saved in the washing plant of the sand-gravel aggregate operation.
274	New Year Diggins (Prouty Ranch)	Not determined	5,6,7 31,32	4S 3S	15E 15E	MD MD	On Browns Creek and its tributaries 7 airline miles north of Merced Falls. Worked in 1927-28 by George W. Tobin and associates of La Grange (Tacoma Mining Company). Deposit estimated to contain 350,000 to 400,000 yards of gravel ranging from a few feet to 47 feet in depth. Values were in fine gold and a little platinum. Some of the gravel yielded 75 cents to a dollar a yard. Gold is believed to have come in part from the numerous pockety veins in the vicinity (Laizure 28:122).
275	K. R. Nutting Company dredge ground	Not determined	1	8S	16E	MD	Adjoins the Bennett-Pate dredge ground on the west and south. Much of the land is on the level floor of the Great Valley just inside the Mariposa County line. Pay gravel is 700 feet wide and 13 feet deep, on the average. Gold content averaged about 15 cents per yard and recovery was 13 cents per yard. In 1938 about 180,000 cubic yards of overburden (soil) was stripped from the deposit and several hundred thousand yards of gravel processed. (Julihn and Horton 40:167.)
276	C. C. Pierce property	Not determined	19(?)	6S	17E	MD	On Corbet Creek 2 miles east of the Ruth Pierce mine. Trebor Corporation processed 100,000 yards of gravel in 1943 ($3\frac{1}{2}$ months) which yielded approximately $10,170 or an average of 10.17 cents per cubic yard (Averill 46:262).
	Prouty Ranch						See New Year Diggins.

PLACER GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
277	Schroeder Placer	Chas. M. and C. F. Schroeder, Mariposa	16	4S	18E	MD	On high ground west of Saxon Creek $1\frac{1}{2}$ miles north of the Buena Vista mine. Ground was described by Lowell (16:600) as bench gravel containing clay and boulders. Washed material remaining on the ground in 1954 was bedrock remnants and soil mantle and it is doubtful if this was an old channel deposit. About 5 acres were ground sluiced by the Schroeder family during the period of World War I. At that time there were $5\frac{1}{2}$ miles of ditches and 1500 feet of pipe lines. Water was supplied by Saxon Creek. Much of the ground was very rich.
278	Success Nugget	Ulysses S. Martin, 156 Second Avenue, San Francisco 18	25	2S	17E	MD	Located 5 miles east and slightly south of Greely Hill. Adjoins the Bondurant mine on the north. Ground consisted of soil mantle and the weathered parts of several veins of the Louisiana vein system. Most of the placering was done prior to 1900.
279	Thoma Ranch dredge ground	Not determined	35 2	7S 8S	17E 17E	MD MD	On border between Mariposa and Merced Counties on Mariposa Creek; 27,000 yards processed in 1950 by Midstate Dredging Company of the Le Grand yielded less than 10 cents per yard.
280	Trebor Corporation dredge grounds	Not determined; formerly part of Mariposa Grant	25 36	5S	18E	MD	On Mariposa Creek at Mormon Bar. Dredged principally during the summer and fall of 1938 by dragline and floating washing plant. Average depth of gravel was only 6 feet and bedrock pinnacles and large boulders hampered operations; 150,000 to 200,000 yards of material was processed that averaged 22 cents per cubic yard (Julihn and Horton 40:161-162). In 1940-42 the Trebor Corporation operated its dredge on the Fretz, Gaskill, Machado, Trabucco, Turner, and Waltz properties in Hunter Valley and on Agua Fria Creek.

PLACER GOLD (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
281	Upper Bear Creek	Not determined	29 32	4S	17E	MD	Between Bear Valley and May Rock. Thin gravels on slate bedrock. Last worked in 1947.
282	Waltz property	Ed P. Waltz, 19 North Sierra Street, Reno, Nevada	12 7	6S 6S	15E 16E	MD MD	On Burns Creek 3 miles south of the Merced-Hornitos road just east of the Mariposa-Merced County line. Worked by dragline dredge 1940-42 by Trebor and Barker Corporations. Also in 1953 by the Adobe Mining Company of Madera. Produced over 355,000 cubic yards of pay ground averaging about 15 cents per cubic yard in 1940 and 1941.

LEAD

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	American Eagle						See under Zinc.
	Blue Moon						See under Zinc.

MANGANESE

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
283	Gale prospect	Not determined	1	3S	15E	MD	On the south side of Highway 132 two hundred yards southeast of the Gale Ranch house and 7.3 miles west of Coulterville. Chert beds striking north and dipping 70° E. contain thin partings and stains of black manganese oxide. The chert, which is white, yellow, or pale red, is part of the Upper Jurassic Hunter Valley formation. This formation extends southeast through the Caldwell mine at Jasper Point. (Wilson, I. F., in Trask, et al. 50:109.) There is one shaft 6 feet square and 20 feet deep, but no systematic development work has been done.
284	Caldwell (Daly)	Not determined	NE¼ 14	3S	15E	MD	Located 1½ miles south of Granite Springs School and 7 miles west of Coulterville via Highway 132. On patented agriculture land (Wilson, I. F. in Trask, et al. 50:106-108).
	Carrier						See Donnelly.
	Daly						See Caldwell.
285	Donnelly (Carrier)	Not determined	17	4S	19E	MD	On the west bank of Sweetwater Creek one-tenth of a mile south of the Donnelly Ranch house, 1 mile north of the Sweetwater gold mine, and 15 miles northeast of Mariposa. Pockets and stringers of black oxides of manganese assaying about 30 percent Mn occur in fine-grained quartzite (metachert) of the Paleozoic Calaveras group of rocks. The metachert is enclosed in mica schist and is cut by quartz veins. The chert belt strikes N. 15° W., dips 70° W., reaches a width of 23 feet and a length of 300 feet. Developed by one open

MANGANESE (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Donnelly (continued)						cut. No record of production and no recent activity. (Wilson, I. F., in Trask, et al. 50:108.)
286	Granite Springs	Dr. Robert D. Dunn, 300 Homer Avenue, Palo Alto	11	3S	15E	MD	Located 1 mile south of Granite Springs School near Willow Creek. Geology and mineral occurrence similar to the Caldwell or Daly mine, which lies farther south. A small tonnage of ore was produced in 1954.
287	Kelm prospect	Not determined	19	3S	16E	MD	At Jasper Point 100 yards south of the old Yosemite Railroad bed. Inaccessible by motor vehicle. Close to the Jasper Point rock quarry on the west. Lenticular masses of black manganese oxide are found in a zone averaging about 6 feet in width. Individual lenses average about 1.5 feet in thickness and contain ore between 45 and 50 percent manganese. One ore body is 35 feet long. The ore zone is in thick-bedded red and green chert of the Upper Jurassic Hunter Valley formation. This formation is several hundred feet thick and is underlain by pillow basalt greenstone. The chert strikes N. 0° to 20° W. and dips 35° to 40° E. The ore occurs near the base of the chert section. Ore is exposed in an open cut 8 by 10 feet in plan and 15 feet deep at the highest face. The ore zone is cut by faults of small displacement and the base of the ore zone is sheared. Fifty to 100 feet above the quarry is a second ore zone at about the same horizon as the other but probably not connected with it. A 30-foot tunnel in jasper encountered no manganese ore, failing to reach the ore horizon. There is no record of production and the property is inactive. (Wilson, I. F., in Trask, et al. 50:109-110.)
	M-Q						See Surprise.
	Mebold and Camin						See Strickland.

MANGANESE (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
288	Robie	Not determined	2	3S	15E	MD	On the Robie Ranch 0.8 of a mile west of Granite Springs School and 7 miles west of Coulterville via Highway 132. Thin bands and stringers of black oxide occur in thick-bedded white chert of the Hunter Valley formation. One shallow pit was the only working in 1942 (Wilson I. F., in Trask et al. 50:110).
	Strickland (Mebold and Camin) prospect	Not determined	8	4S	19E	MD	On the west bank of Sweetwater Creek 4.2 miles north of the Sweetwater gold mine, 3.2 miles by road north of the Donnelly manganese prospect, and 16 miles northeast of Mariposa. On patented land. Manganese oxides occur disseminated in gray metachert 13 feet in maximum thickness, but averaging about 5 feet. The chert, which is enclosed in mica schist, strikes N. 60° W. and dips 75° SW. These metasediments are part of the Paleozoic Calaveras group of rocks. In addition to disseminated manganese oxides there are scattered pockets and small lenses of high-grade ore containing 45 percent manganese. A little relict pink rhodonite indicates the character of the primary ore (Wilson, I.F., in Trask et al. 50:111).
289	Surprise (M-Q) prospect	Not determined	E½ 23	3S	17E	MD	On Indian Creek 0.2 of a mile northwest of its confluence with the North Fork of the Merced River, 2 miles southeast of the Quail gold mine and 8 miles northeast of Bagby. Accessible only by trail. Unoxidized rhodonite-rhodochrosite ore occurs in lenticular masses in quartz schist and quartzite. The sheets of quartz schist in turn are enclosed by blue-gray phyllite. These metasediments belong to the Paleozoic Calaveras group of rocks. They strike N. 60°-70° W., dip very steeply east or are vertical. Pink, brown, and buff rhodochrosite-rhodonite occurs with some spessartite garnet. The small amount of black oxide ore present contains 41.3% manganese, 2-8% iron, 8.1% silica, 0.04% sulfur and 0.13%

MANGANESE (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Surprise (M-Q) prospect (continued)						phosphorus pentoxide (Taliaferro, N. L., in Trask et al. 50:111-112).

QUICKSILVER

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
69	Crystal	Ralph E. and Libbie N. Daley, 1165 West 22d Street, Merced	15 16	3S	16E	MD	A patented property of 17.19 acres. Cinnabar occurs as drusy crystals and blebs in calcite vein matter and in hydrothermally altered greenstone immediately adjacent to the vein. The principal occurrence noted by Turner and Ransome (97:7) is shown on the folio map to be about midway between the intersection points of the Lookout and Cabinet veins. See tabulated list under Gold, the Crystal mine.

SILVER

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bryan						See Silver Bar.
	Goat Camp prospect	Not determined	14	2S	18E	MD	Located 1½ miles west of Pilot Peak. Quartz vein containing galena-pyrite ore occurs between a 100-foot wide belt of talcose rock, forming the hanging wall, and a foot-wall of chert and schist. Some of the ore ran $30 to $40 per ton, mainly in lead and silver (Walter McLean, personal communication, 1956).
	Goldenrod						See Silver Lane.
	Johnny Green						See under Copper.
	Silver						See Silver Bar.
290	Silver Bar (Bryan, Silver)	Jeffery Investment Company, 7041 Thornhill Drive, Oakland	8,9	6S	19E	MD	Three airline miles south and slightly west of Bootjack and 1 mile north of the Silver Lane mine (Laizure 28: 123; 35:44; Julihn and Horton 40:163; herein).
291	Silver Lane	Not determined	8,9 16 17	6S	19E	MD	Four airline miles south and slightly west of the Bootjack and 1/2 mile south of the Silver Bar mine (Laizure 35:44; Julihn and Horton 40:164; herein)
	Silver Lead						See under Gold.
	Wallman Ranch						See Silver Lane.

TUNGSTEN

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
292	Big Grizzly group	J. E. Diffenbaugh, L. E. Atwood, et al., 2110 Grape Street, Abiline, Texas	17	3S	19E	MD	On the east side of Ned Gulch 1 mile northwest of Clearinghouse on the Merced River. Gold-bearing quartz veins also contain scheelite. Six roughly parallel veins 1 to 3 feet wide cross the property which strike approximately N. 45° W. and dip northeast at angles ranging from 30° to 70°. The veins have been developed by several short adits and open cuts. (Tucker and Sampson 41:480.)
293	Blue Dipper group	L. W. and W. J. Barnett, Box 33, El Portal; John Milanovitch, Box A, El Portal; and Otto Mayer, Box 33, El Portal (1954)	2 11	3S	20E	MD	On steep terrain on the east side of Dry Gulch $3\frac{1}{2}$ airline miles northwest of El Portal. Approached by about 12 miles of dirt road from Crane Flat on Highway 120. Discussed herein.
	Blue Moon group	Otto Mayer et al., Box 357, Mariposa	8?	3S	20E	MD	
294	Blue Spot group	John Milanovitch, Box A, El Portal; Barnett Brothers, Box 33, El Portal	7	3S	20E	MD	On steep terrain $1\frac{1}{2}$ airline miles northwest of El Portal. Approached by $2\frac{1}{2}$ miles of steep dirt road from Rancheria Flat on Highway 140. Extensive road construction work to make this group of claims accessible for exploration was never completed and so far as the authors know there has been no production thus far. Scheelite occurs in limy beds near the contact between granitic rocks and a metasedimentary series made up chiefly of massive quartz-biotite rock.
295	Blue Star group	L. W. and W. J. Barnett, Box 33, El Portal	23	3S	19E	MD	Half a mile east of Indian Flat on State Highway 140. Approached by half a mile of dirt road leading south from Highway 140 about half a mile east of Indian Flat guard station of the U. S. Forest Service. Tungsten

TUNGSTEN (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Blue Star group (continued)						occurs in tactite along the border of a small limestone pendant in granitic rocks. About 200 tons were mined in 1954 and milled at the Incline Mining Company mill in 1955.
	Donna group	Not determined	NW¼ 4	3S	20E	MD	On Crane Creek 4½ airline miles south and slightly east of Crane Flat on State Highway 140. Approached from Crane Flat by 6½ miles of road and 1 mile of trail. A series of prospects with no known production.
	Early						See under Gold.
296	Garnet Queen group	Sierraposa Mining Company, 508 Fourth Street, San Francisco 7 (Hudson, Law, Toye, and Odgers)	8	3S	20E	MD	Half a mile west of El Portal in the canyon running south from Eagle Peak.
	Lucky Spot group	Clyde Gann, El Portal	8 ?	3S	20E	MD	
297	Maybe	John Milanovitch, Box A, El Portal	8	3S	20E	MD	On the south slope of Eagle Peak half a mile north of El Portal.
	Victory Tungsten	Jacob H. Manzey and Lloyd E. Ashley, Box 93, Groveland (1954)	8	3S	20E	MD	Small production from scheelite in tactite (Tucker and Sampson 42:337).
	War Baby	Not determined	9	6S	21E	MD	Small production of scheelite in tactite. Operated in 1939-40 by Bissett and Rea. May now be held under another name (Tucker and Sampson 42:337).

TUNGSTEN (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
298	Washington Tungsten	Miller and Associates, Nelson Cove, Mariposa County	20	6S	20E	MD	Near the East Fork of the Chowchilla River half a mile east of Indian Peak close to the Madera County line. A mill run on the ore has been made and the associations plants increase the mill capacity (California Min. Jour. November 1955).

ZINC

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
299	Akoz (B.A.B., Radium, Asposozien)	Carlin Estate, c/o Mrs. P. Erickson, La Grange	9,10	4S	15E	MD	Near Webb Station 5½ airline miles north of Merced Falls and 7.8 miles by road from Merced Falls (Wiebelt 47: 1-6; herein).
300	American Eagle (Bullion Hill, Blue Bell, and Bonanza)	Jack I. and Irene Kapp (1/3), 1650 Liberty Street, Santa Clara; Edward C. Morrison (1/3), Karbel, and Vallerde Brothers, Box 568, Portola	30	4S	16E	MD	A patented property of 20 acres 3 airline miles northwest of Hornitos. Adjoins the Blue Moon mine on the south (Castello 21:109; Eric and Cox 47:143-144; herein).
	Asposozien						See Akoz.
	B. A. B.						See Akoz.
	Blue Cloud						See Blue Moon.
301	Blue Moon (Blue Cloud, Red Cloud, Porcupine)	Not determined; last operated by Hecla Mining Company, Wallace, Idaho	19 30	4S	16E	MD	Located 4 airline miles northwest of Hornitos. Adjoins American Eagle mine on the north (Eric and Cox 48:144-147; herein).
	Porcupine						See Blue Moon.
	Radium						See Akoz.
	Red Cloud						See Blue Moon.

ANDALUSITE

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
302	Southwest of Three Buttes deposit	Not determined	SW$\frac{1}{4}$ 17	6S	16E	MD	Astride the Indian Gulch-Planada road 1$\frac{1}{4}$ miles southwest of Indian Gulch. Described herein.

BARITE

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
303	Egenhoff (Devils Gulch)	California Barite Corporation, c/o Edwin Earl, 1102 Rowan Building, Los Angeles	17 21	4S	20E	MD	Located 2 miles northwest of Chowchilla Mountain, near the top of the ridge between Granite Creek Canyon and Devils Gulch 3 airline miles east of Jerseydale (Laizure 28:144; 35:46; Bradley 30:52; Julihn and Horton 40:170; herein).
304 304A	El Portal Barite	El Portal Mining Company, c/o R. J. Groves, Trust Department, 464 California Street, San Francisco	18 19	3S	20E	MD	Astride the Merced River and Highway 140, one and one half miles west of El Portal (Lowell 16:571; Castello 21:102; Laizure 28:144; Bradley 30:51; Young 30: 70-71; Julihn and Horton 40:168-170; Braun 50:130-132; herein).

LIMESTONE & DOLOMITE

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bondshu deposit						See Marble Point deposit.
305	Bower Cave deposits	Not determined	19,20 29,30	2S	18E	MD	Astride the Briceburg-Kinsley-Coulterville road 19 miles from Briceburg (Logan 47:252; herein).
306	Cotton Creek deposit	Not determined	18	4S	16E	MD	Just north of the Cotton Creek arm of Exchequer Lake 3 miles southeast of Granite Springs School (Logan 47:252; herein).
	Emory deposit						See Jenkins Hill deposit.
307	Jenkins Hill deposit (Emory, Yosemite Cement, Timertone, Richardson)	John Richardson, 1124 South Fifth Avenue, Arcadia	7 18	3S	19E	MD	One mile north of the Merced River and 8 miles northeast of Briceburg (Lowell 16:601; Laizure 28:148; Stevenson 27:79; herein).
308	Kinsley deposit	Not determined	4,9	3S	18E	MD	Half a mile west of Kinsley guard station of the U. S. Forest Service near the Briceburg-Kinsley-Coulterville road; discussed herein.
309	Marble Point deposit	Not determined	2	4S	19E	MD	On the south side of the South Fork of the Merced River $1\frac{1}{2}$ miles south and slightly east of Hite Cove (Lowell 16:501; Logan 47:252; herein).
310	O'Brien deposit	Miss Ethel T. O'Brien et al., 1534 Clay Street, San Francisco	$N\frac{1}{2}$ $NE\frac{1}{4}$ 11	4S	18E	MD	One mile southeast of Briceburg (Logan 47:253; herein).
	Richardson deposit						See Jenkins Hill deposit.
	Timertone deposit						See Jenkins Hill deposit.
	Yosemite Cement deposit						See Jenkins Hill deposit.

MAGNESITE

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Ashworth Ranch deposit (Big Spring Hill)	Not determined	30	5S	19E	MD	Half a mile east of Mormon Bar on Big Spring Hill are several magnesite veins of variable width up to 2 feet. These occur in weathered serpentine adjacent to a spring deposit of siliceous sinter. The occurrence is undeveloped and probably is too small to be of economic importance (Laizure 28:148).
	Big Spring Hill						See Ashworth Ranch.

MICA

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
311	Brushy Canyon deposits	Not determined	1,2	7S	17E	MD	In the White Rock district 2 miles north and slightly west of White Rock School. Discussed herein.

ROCK, SAND, & GRAVEL

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
312	Humbug Creek deposits	W. J. Saye, Mariposa	10	6S	19E	MD	On Humbug Creek 2½ airline miles south of Bootjack. Granitic debris in Humbug Creek. Intermittently operated.
313	Jasper Point	Not determined	19	3S	16E	MD	On the south side of the Merced River at Jasper Point on the old road bed of the Yosemite Valley Railroad. Rock is chiefly yellow and red jasperoid chert of the Upper Jurassic Hunter Valley formation. Beds are over 100 feet wide and stand almost vertical. Operated about time of World War I by Stone Company of San Francisco and by various lessees. Idle because of remoteness from markets. (Lowell 16:602.)
314	Mariposa Sand and Gravel Company	George P., J. G., and E. C. Greenamayer, Mariposa	25 36	5S	18E	MD	On Mariposa Creek 1½ miles south of Mariposa. Described herein.
	Yosemite Stone quarry	Not determined	14	4S	15E	MD	Five miles northeast of Merced Falls on the old roadbed of the Yosemite Valley Railroad. Rock is a massive greenstone about 500 feet wide and standing nearly vertical. Bordered by slaty metasediments. Operated during World War I by Ransome-Crummey Company of Oakland (Lowell 16:603).

ROOFING GRANULES & TERRAZZO CHIPS

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
315	Sonora Marble Aggregate deposit	Sonora Marble Aggregates Company, Sonora	NW¼ 19	3S	17E	MD	On the Bagby grade of Highway 49 about 3 miles northwest of Bagby. Described herein.

SILICA

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Le Grande						See White Rock.
316	White Rock deposit	Kaiser Aluminum and Chemical Company, 1924 Broadway, Oakland	14,15	7S	17E	MD	Half a mile north of the Mormon Bar-Le Grande road and $1\frac{1}{2}$ miles west of White Rock School. Operated in the 1920's by Kelm and Carman of Le Grande and from 1942-52 by the present owners or the predecessors in the Kaiser organization (Laizure 28:150; herein).

SLATE

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Cunningham quarries	Not determined	6,7,8 17	7S	17E	MD	Located 7 airline miles south of Cathay astride Mariposa Creek. Some sheets of roofing slate were produced prior to 1914. Idle.
317	Miles Creek deposits	Not determined	2,3 35	7S 6S	16E 16E	MD MD	On the northwest side of Highway 140 about 7 miles from Planada. A series of quarries in the Mariposa formation. Idle for more than 10 years.
318	Nigger Hill deposit	Lee I. Rowland, Mariposa	21	5S	18E	MD	On the south side of Agua Fria Creek and Highway 140 at the north end of Nigger Hill. Discussed herein.
319	Pacific Slate Company quarries	Not determined	6	6S	16E	MD	Located 3 miles southwest of Indian Gulch. Produced sheets of roofing slate prior to 1914. Idle.

TALC

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	LOCATION T.	LOCATION R.	LOCATION B & M	REMARKS
	Cuneo						See Talc.
	Lacy						See Talc.
	Gordon deposit	Not determined	24?	2S	16E	MD	On Greeley Hill 1 mile west of Greeley Hill School. Supplied soapstone building blocks for many of the early buildings in Coulterville (Heizer and Fenenga 48:103).
	Prouty Ranch deposit	Not determined	11	4S	15E	MD	Located 1 mile southeast of Webb Station and 4 miles north of Merced Falls. An undeveloped occurrence (Laizure 28:152) on the Robert Prouty Ranch.
	Shaw Talc deposit	Not determined	32	3S	17E	MD	Located 1½ miles northeast of Bagby in rugged country east of Flyaway Gulch. Claims were held in the late 1920's by Robert Shaw of Sonora. Property is relatively inaccessible and is believed to be undeveloped (Laizure 28:152).
	Talc (Cuneo, Lacy)	Catherine Cuneo estate, 1011 Twenty-Second Street, Merced	19	3S	17E	MD	Located 7 miles southeast of Coulterville at the head of Flyaway Gulch. A patented gold property of 20 acres. Soapstone occurs along the southwest contact of the vein-dike system in the workings of the gold mine. There has been no production and the amount of soapstone present is probably small. The talc grades into serpentine. See under Gold.
	Yosemite Talc	Not determined	31	3S	17E	MD	At the lower end of Flyaway Gulch near Highway 49. Operated in the 1920's by T. B. Elliott of Angels Camp. According to Laizure (28:152) the deposit is 75 feet wide and the talc is white. Workings consist of several open cuts and a 75-foot shaft. The talc contains 61% SiO_2, 32.55% MgO, 2.5% R_2O_3 (R = Al + Fe) and 2.3% water.

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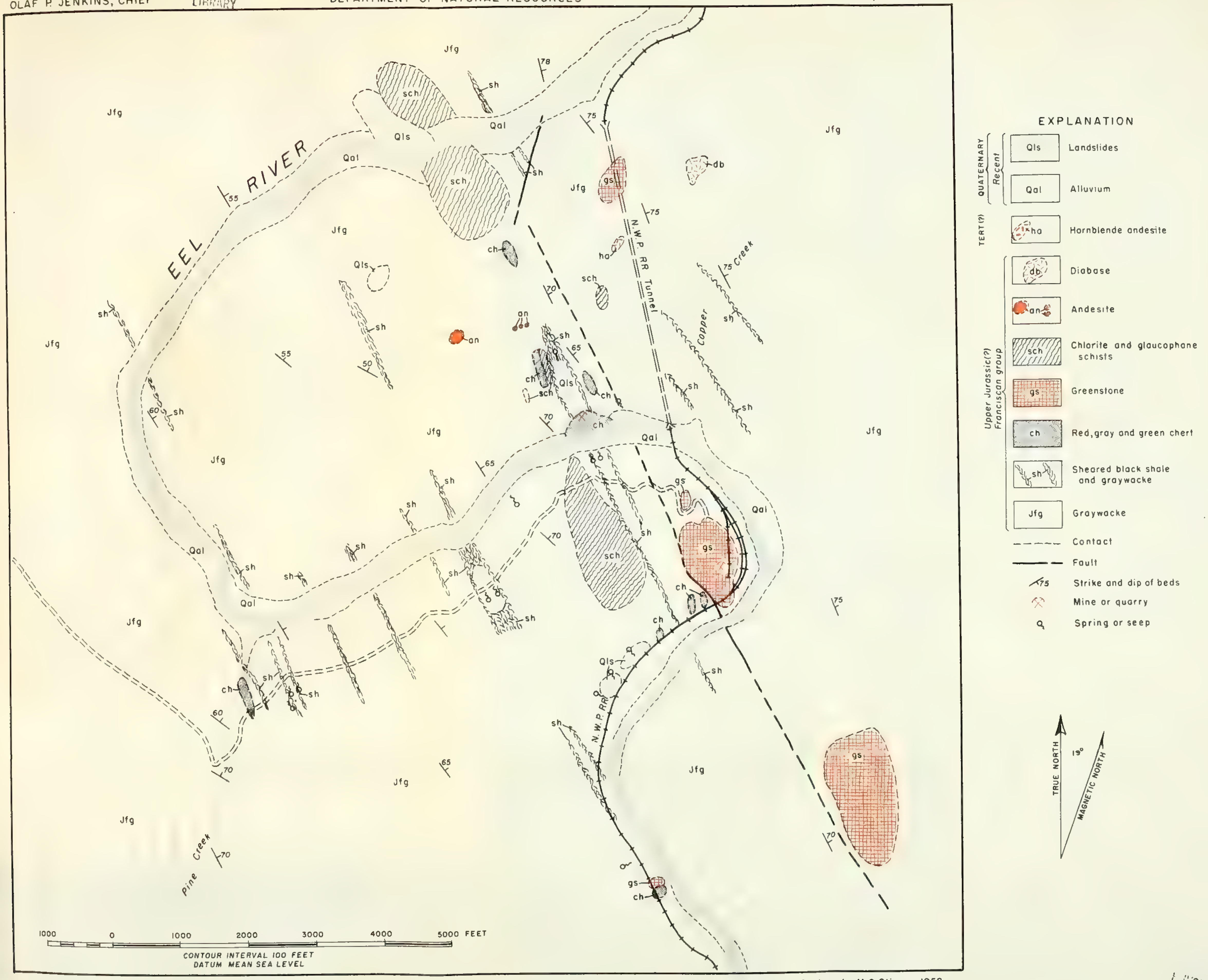
EEL RIVER
Copper Creek
Pine Creek
N.W.P. RR Tunnel
N.W.P. RR
Jfg
Qal
Qls
sch
sh
ch
gs
an
ha
db
EXPLANATION
QUATERNARY
Recent
Qls Landslides
Qal Alluvium
TERT(?)
ha Hornblende andesite
Upper Jurassic(?) Franciscan group
db Diabase
an Andesite
sch Chlorite and glaucophane schists
gs Greenstone
ch Red, gray and green chert
sh Sheared black shale and graywacke
Jfg Graywacke
Contact
Fault
75 Strike and dip of beds
Mine or quarry
Spring or seep
TRUE NORTH
MAGNETIC NORTH
19°
1000 0 1000 2000 3000 4000 5000 FEET
CONTOUR INTERVAL 100 FEET
DATUM MEAN SEA LEVEL

Base from U.S. Geological Survey
Alderpoint and Hoaglin quadrangles

Geology by M. C. Stinson, 1952

GEOLOGIC MAP OF THE ISLAND MOUNTAIN AREA TRINITY COUNTY, CALIFORNIA

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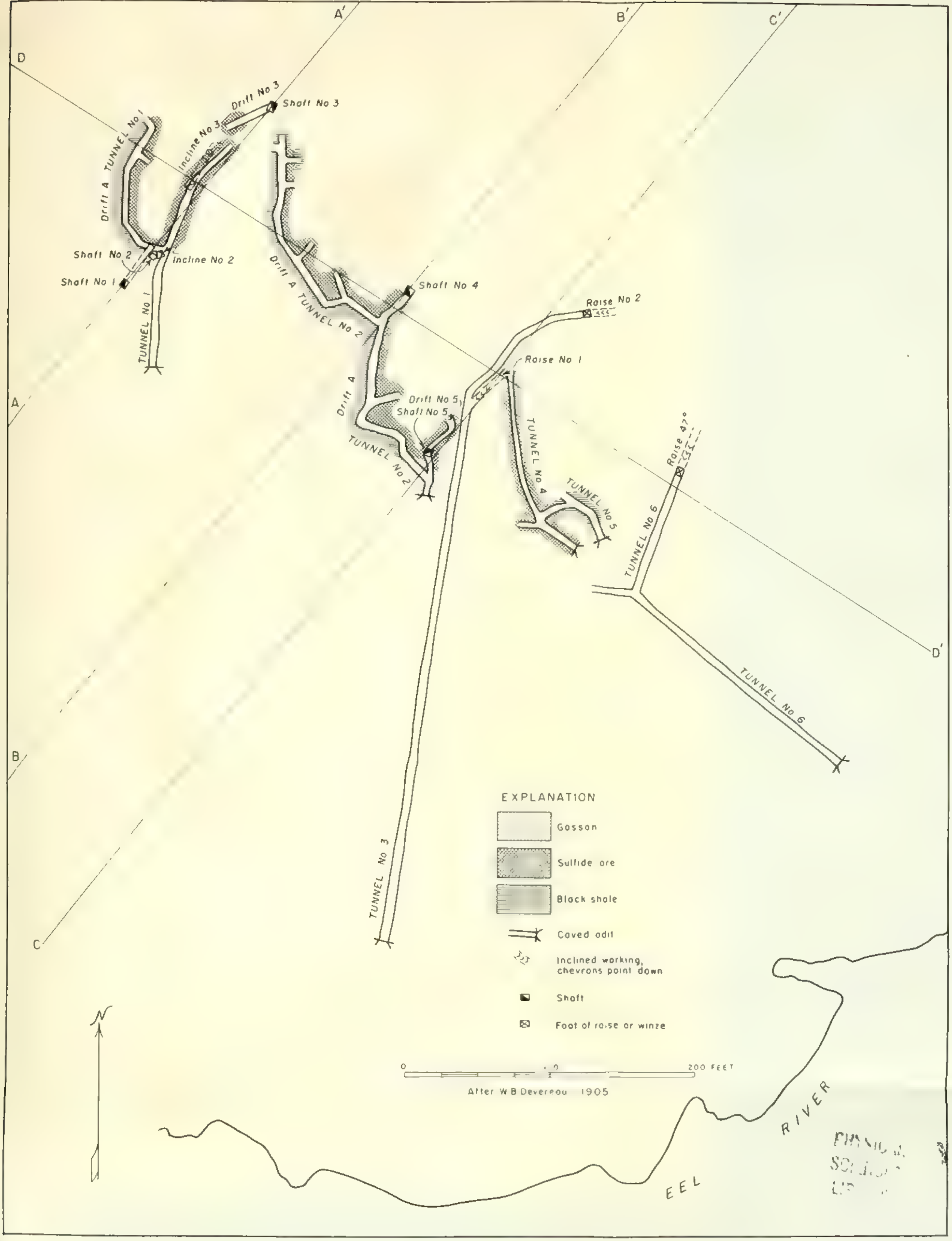
A'
B'
C'
D
Drift No 3
Shaft No 3
TUNNEL No 1
Incline No 3
Drift A
Shaft No 2
Incline No 2
Shaft No 1
TUNNEL No 1
Drift A TUNNEL No 2
Shaft No 4
Raise No 2
Raise No 1
Drift A
Drift No 5
Shaft No 5
TUNNEL No 2
TUNNEL No 4
TUNNEL No 5
Raise 47°
TUNNEL No 6
A
D'
TUNNEL No 6
B
EXPLANATION
Gosson
Sulfide ore
Block shale
Coved adit
Inclined working, chevrons point down
Shaft
Foot of raise or winze
TUNNEL No 3
C
N
0
100
200 FEET
After W B Devereux 1905
RIVER
EEL

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GEOLOGIC MAP OF UNDERGROUND WORKINGS, ISLAND MOUNTAIN MINE
TRINITY COUNTY, CALIFORNIA

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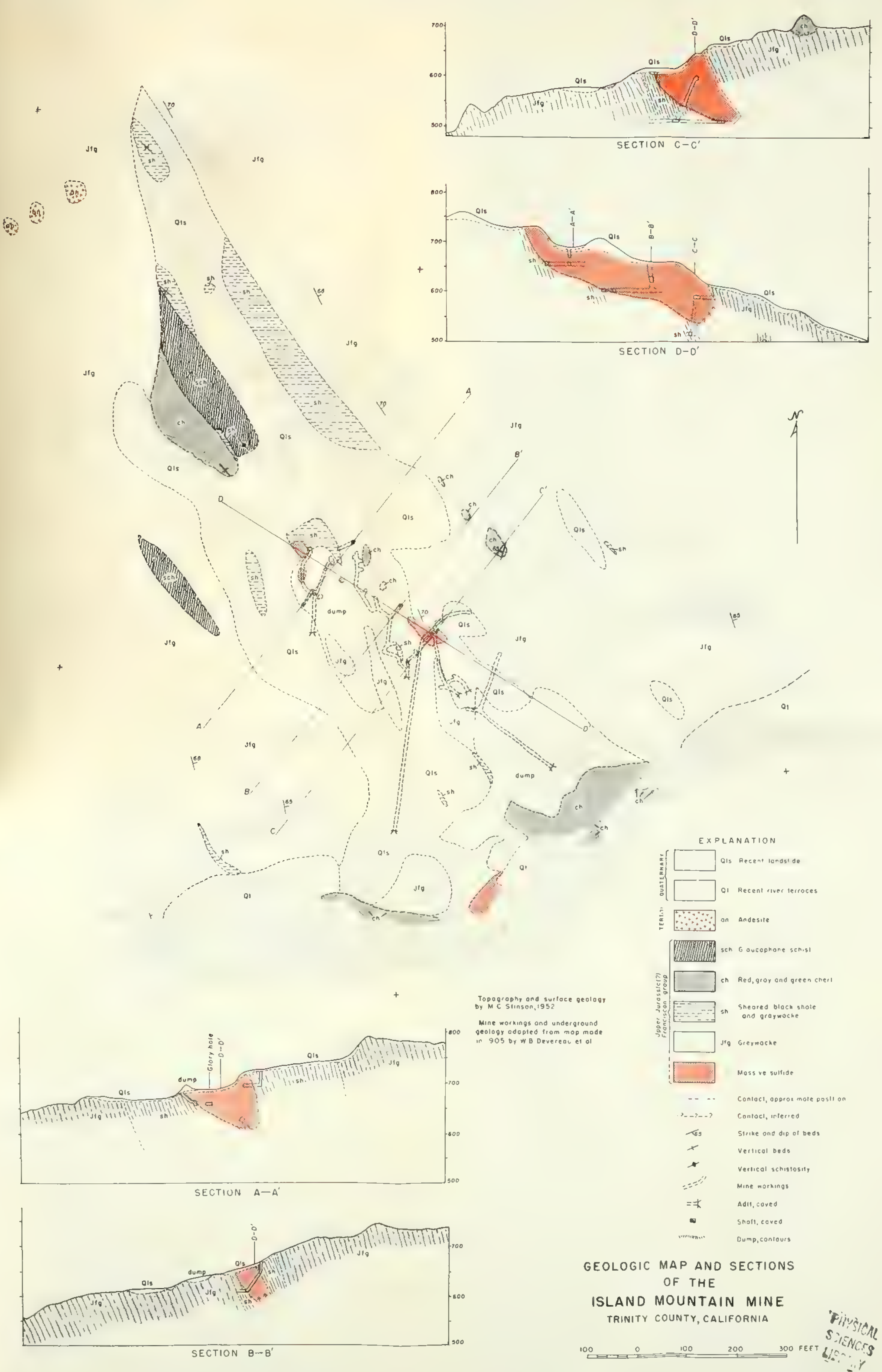

SECTION C—C'

SECTION D—D'

SECTION A—A'

SECTION B—B'

EXPLANATION

QUATERNARY	Qls	Recent landslide
	Ql	Recent river terraces
TERTIARY	an	Andesite
Upper Jurassic(?) Franciscan group	sch	Glaucophane schist
	ch	Red, gray and green chert
	sh	Sheared black shale and graywacke
	Jfg	Greywacke
		Massive sulfide

- - - Contact, approximate position

?--?--? Contact, inferred

Strike and dip of beds

Vertical beds

Vertical schistosity

Mine workings

Adit, caved

Shaft, caved

Dump, contours

Topography and surface geology
by M C Stinson, 1952

Mine workings and underground
geology adapted from map made
in 1905 by W B Devereau et al

GEOLOGIC MAP AND SECTIONS
OF THE
ISLAND MOUNTAIN MINE

TRINITY COUNTY, CALIFORNIA

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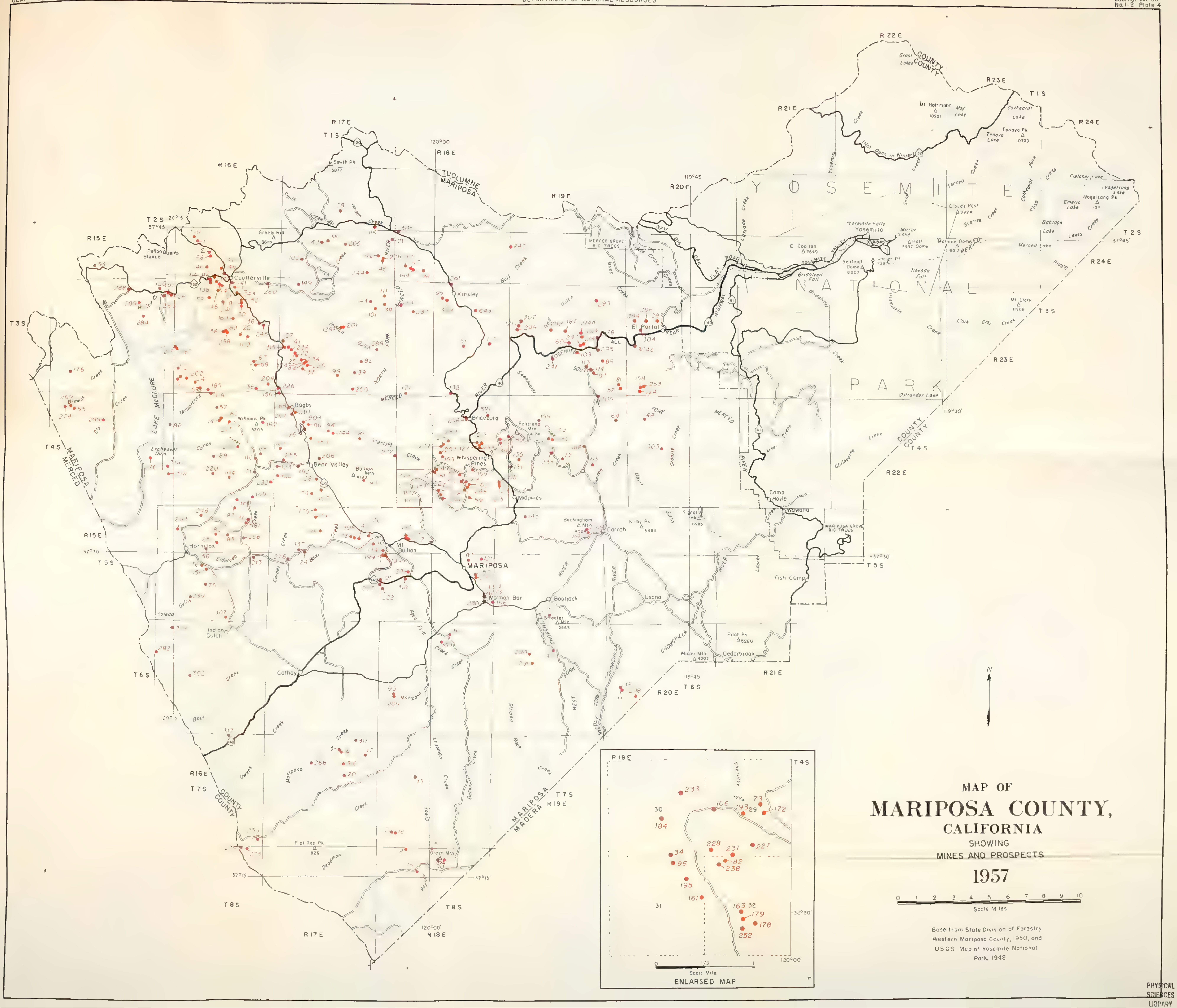
YOSEMITE NATIONAL PARK
TUOLUMNE
MARIPOSA
MERCED
MADERA
COUNTY
Coulterville
Greeley Hill
Smith Pk
Peñon Blanco
Kinsley
El Portal
Bagby
Briceburg
Feliciana Mtn
Whispering Pines
Bear Valley
Midpines
Mt Bullion
MARIPOSA
Mormon Bar
Bootjack
Usona
Hornitos
Indian Gulch
Cathay
Catheys Valley
Buckingham Mtn
Carrah
Kirby Pk
Signal Pk
Camp Hoyle
Wawona
Mariposa Grove Big Trees
Fish Camp
Pilot Pk
Miami Mtn
Cedarbrook
Striped Mtn
Green Mtn
Flat Top Pk
Exchequer Dam
Lake McClure
Williams Pk
MERCED RIVER
NORTH FORK
SOUTH FORK
CHOWCHILLA RIVER
Yosemite Falls
Yosemite
Mirror Lake
Half Dome
Sentinel Dome
Glacier Pt
Bridalveil Fall
Nevada Fall
Clouds Rest
Mt Hoffmann
Tenaya Pk
Tenaya Lake
Cathedral Lake
Mt Clark
Ostrander Lake
Merced Lake
Vogelsang Pk
Fletcher Lake
Emeric Lake
Babcock Lake
El Capitan
R 15 E
R 16 E
R 17 E
R 18 E
R 19 E
R 20 E
R 21 E
R 22 E
R 23 E
R 24 E
T 1 S
T 2 S
T 3 S
T 4 S
T 5 S
T 6 S
T 7 S
T 8 S
120°00'
119°45'
119°30'
37°45'
37°30'
37°15'
N
ENLARGED MAP
Scale Mile
0
1/2

MAP OF

MARIPOSA COUNTY,
CALIFORNIA

SHOWING
MINES AND PROSPECTS

1957

0 1 2 3 4 5 6 7 8 9 10
Scale Miles

Base from State Division of Forestry
Western Mariposa County, 1950, and
USGS Map of Yosemite National
Park, 1948

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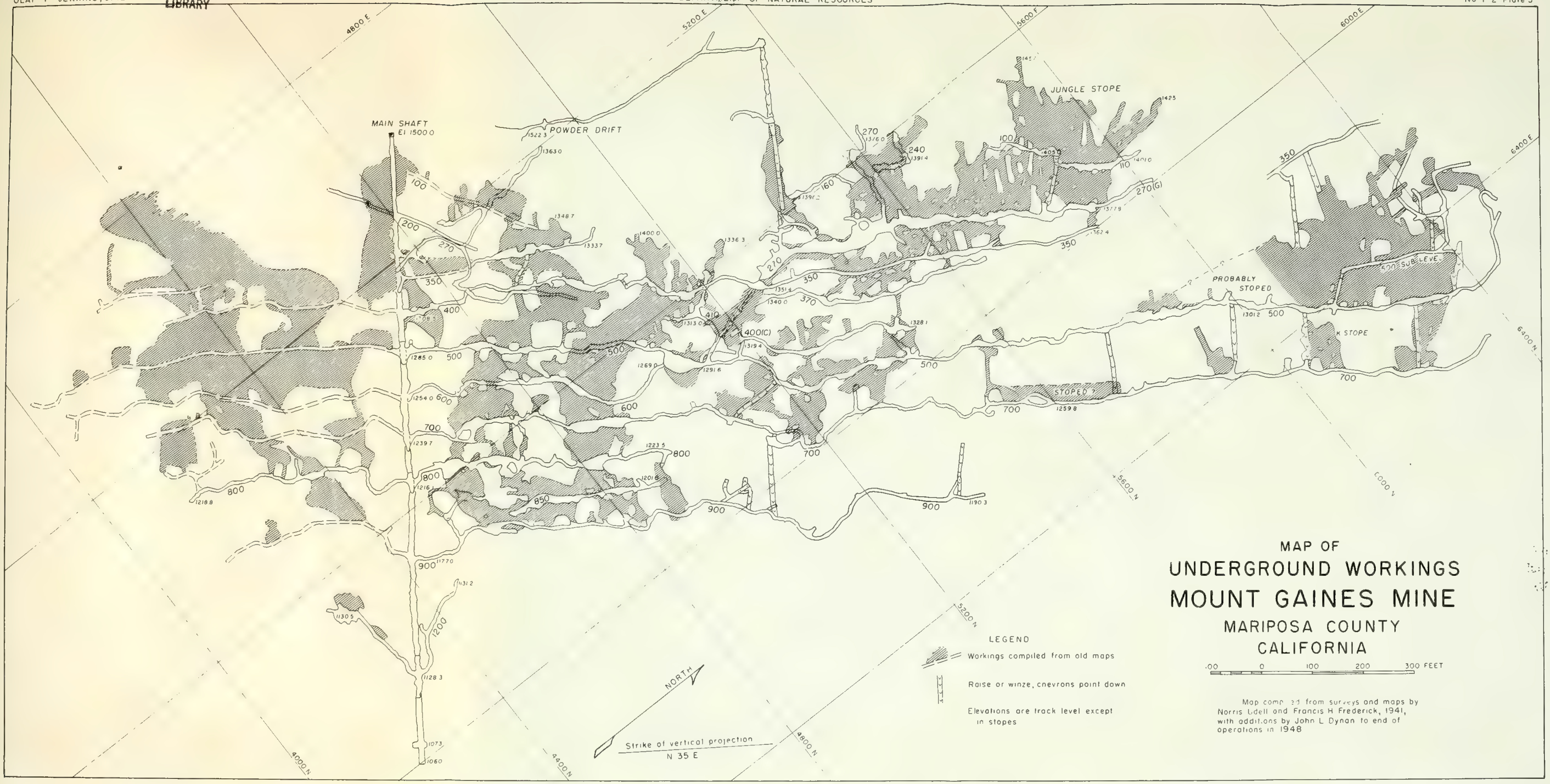

4800 E
5200 E
5600 E
6000 E
6400 E
MAIN SHAFT
El 1500.0
POWDER DRIFT
JUNGLE STOPE
PROBABLY STOPED
K STOPE
STOPED ?
500 SUB LEVEL
100
200
270
350
400
400(C)
410
370
160
240
110
270(G)
500
600
700
800
850
900
1200
6400 N
6000 N
5600 N
5200 N
4800 N
4400 N
4000 N
NORTH
Strike of vertical projection
N 35 E

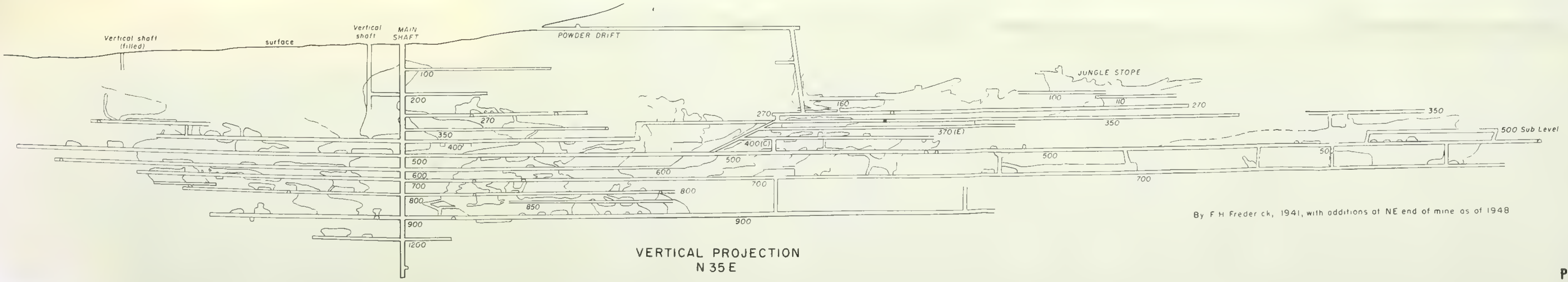
MAP OF
UNDERGROUND WORKINGS
MOUNT GAINES MINE
MARIPOSA COUNTY
CALIFORNIA

100 0 100 200 300 FEET

LEGEND

▨	Workings compiled from old maps
	Raise or winze, chevrons point down
	Elevations are track level except in stopes

Map compiled from surveys and maps by Norris Udell and Francis H Frederick, 1941, with additions by John L Dynan to end of operations in 1948


Vertical shaft (filled)
surface
Vertical shaft
MAIN SHAFT
POWDER DRIFT
JUNGLE STOPE
100
110
160
200
270
350
370(E)
400
400(C)
500
500 Sub Level
600
700
800
850
900
1200

By F H Frederick, 1941, with additions at NE end of mine as of 1948

VERTICAL PROJECTION
N 35 E

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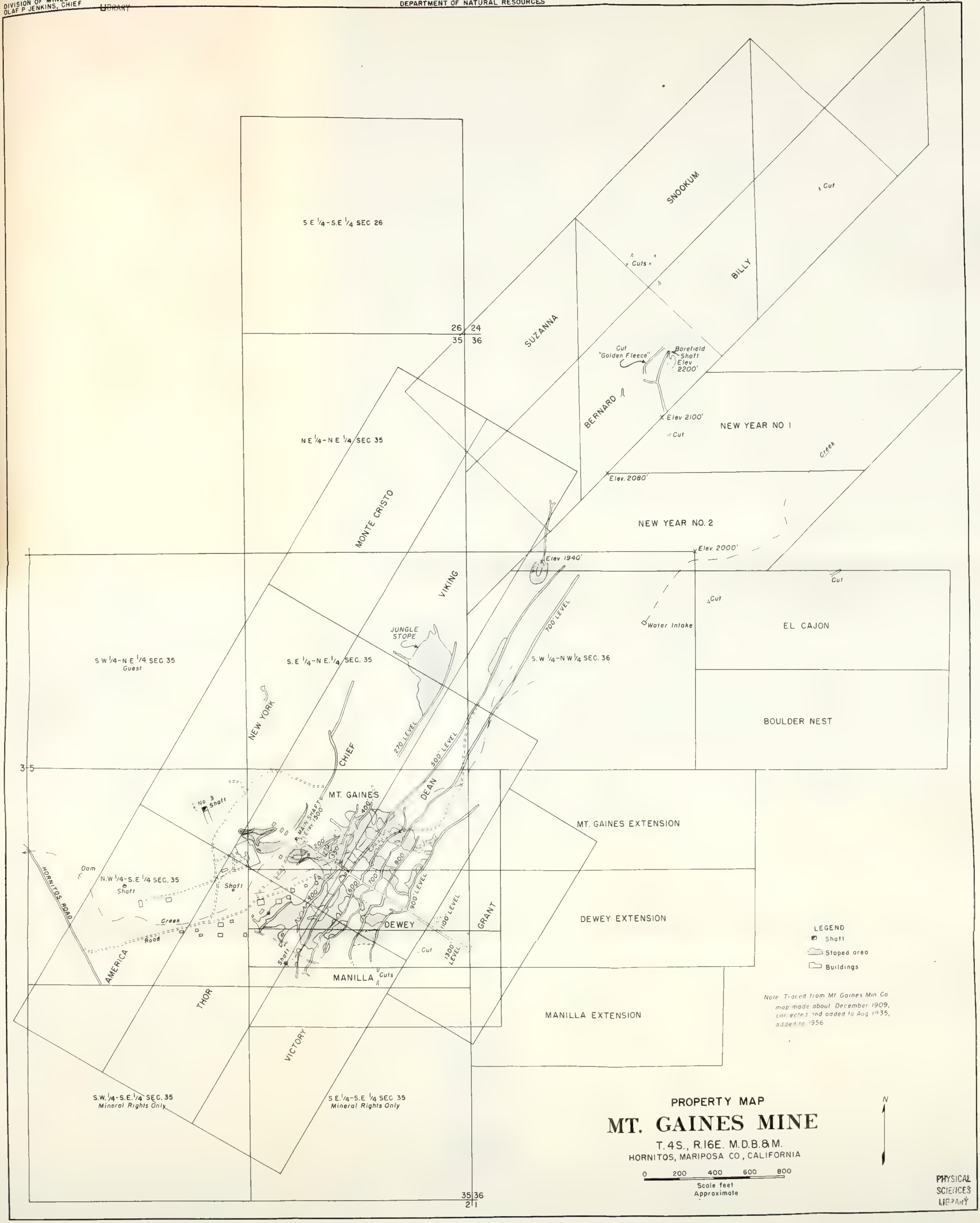
Journal Vol. 53
No 1-2 Plate 6


S E 1/4-S.E 1/4 SEC 26
26 24
35 36
SNOOKUM
Cut
Cuts
BILLY
SUZANNA
Cut
"Golden Fleece"
Barefield Shaft
Elev 2200'
BERNARD
Elev 2100'
Cut
NEW YEAR NO 1
Creek
NE 1/4-N E 1/4 SEC 35
MONTE CRISTO
Elev. 2080'
NEW YEAR NO. 2
Elev 2000'
Elev 1940'
VIKING
Cut
Cut
700' LEVEL
Water Intake
EL CAJON
JUNGLE STOPE
SW 1/4-N E 1/4 SEC 35
Guest
S.E 1/4-N E. 1/4 SEC. 35
S.W 1/4-N W 1/4 SEC. 36
BOULDER NEST
NEW YORK
270 LEVEL
CHIEF
500' LEVEL
3-5
DEAN
MT. GAINES
No 3 Shaft
MAIN SHAFT
Elev 1500'
400
200'
270
330
MT. GAINES EXTENSION
800
700
600
400
900' LEVEL
Dam
N.W 1/4-S.E 1/4 SEC. 35
Shaft
Shaft
HORNITOS ROAD
Creek
Road
DEWEY
1100' LEVEL
GRANT
DEWEY EXTENSION
Cut
1300' LEVEL
Shaft
AMERICA
MANILLA
Cuts
THOR
MANILLA EXTENSION
VICTORY
S.W. 1/4-S.E. 1/4 SEC. 35
Mineral Rights Only
S.E. 1/4-S.E 1/4 SEC 35
Mineral Rights Only
35 36
2 1
LEGEND
Shaft
Stoped area
Buildings
N
0
200
400
600
800
Scale feet
Approximate

Note Traced from Mt Gaines Min Co map made about December 1909, corrected and added to Aug 1935, added to 1956

PROPERTY MAP

MT. GAINES MINE

T. 4 S., R. 16 E. M.D.B.& M.
HORNITOS, MARIPOSA CO., CALIFORNIA

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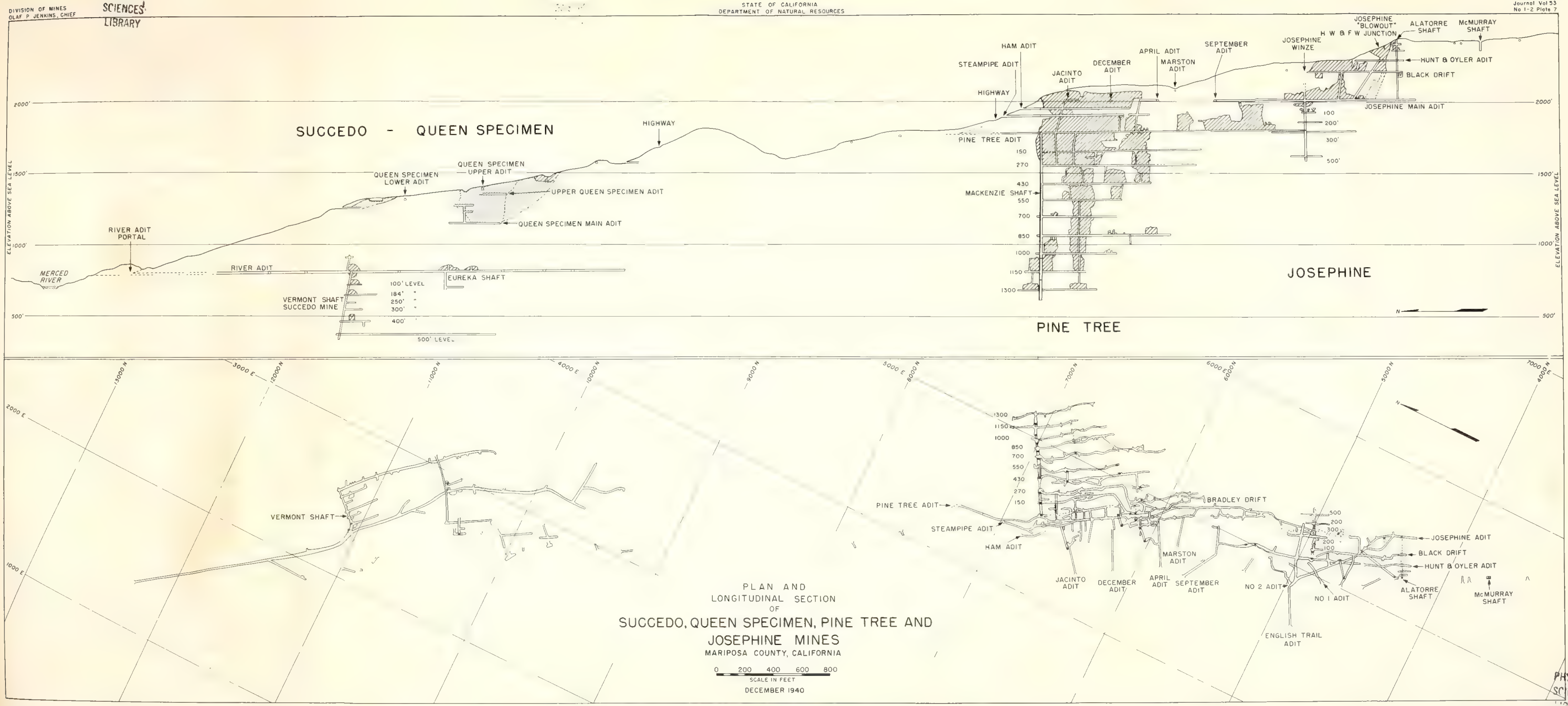
SUCCEDO - QUEEN SPECIMEN
PINE TREE
JOSEPHINE
ELEVATION ABOVE SEA LEVEL
2000'
1500'
1000'
500'
MERCED RIVER
RIVER ADIT PORTAL
RIVER ADIT
VERMONT SHAFT SUCCEDO MINE
100' LEVEL
184' "
250' "
300' "
400'
500' LEVEL
EUREKA SHAFT
QUEEN SPECIMEN LOWER ADIT
QUEEN SPECIMEN UPPER ADIT
UPPER QUEEN SPECIMEN ADIT
QUEEN SPECIMEN MAIN ADIT
HIGHWAY
HIGHWAY
STEAMPIPE ADIT
HAM ADIT
JACINTO ADIT
DECEMBER ADIT
APRIL ADIT
MARSTON ADIT
SEPTEMBER ADIT
JOSEPHINE WINZE
JOSEPHINE "BLOWOUT"
H W & F W JUNCTION
ALATORRE SHAFT
McMURRAY SHAFT
HUNT & OYLER ADIT
BLACK DRIFT
JOSEPHINE MAIN ADIT
100
200'
300'
500'
PINE TREE ADIT
150
270
430
MACKENZIE SHAFT
550
700
850
1000
1150
1300
N
3000 E
4000 E
5000 E
6000 E
7000 E
2000 E
1000 E
13000 N
12000 N
11000 N
10000 N
9000 N
8000 N
7000 N
6000 N
5000 N
4000 N
N
VERMONT SHAFT
1300
1150
1000
850
700
550
430
270
150
PINE TREE ADIT
STEAMPIPE ADIT
HAM ADIT
BRADLEY DRIFT
JACINTO ADIT
DECEMBER ADIT
APRIL ADIT
MARSTON ADIT
SEPTEMBER ADIT
NO 2 ADIT
NO 1 ADIT
ENGLISH TRAIL ADIT
500
200
300
200
100
JOSEPHINE ADIT
BLACK DRIFT
HUNT & OYLER ADIT
ALATORRE SHAFT
McMURRAY SHAFT
0 200 400 600 800
SCALE IN FEET

PLAN AND
LONGITUDINAL SECTION
OF
SUCCEDO, QUEEN SPECIMEN, PINE TREE AND
JOSEPHINE MINES
MARIPOSA COUNTY, CALIFORNIA

DECEMBER 1940

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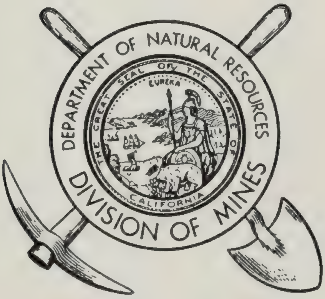
CALIFORNIA JOURNAL
OF
MINES AND GEOLOGY



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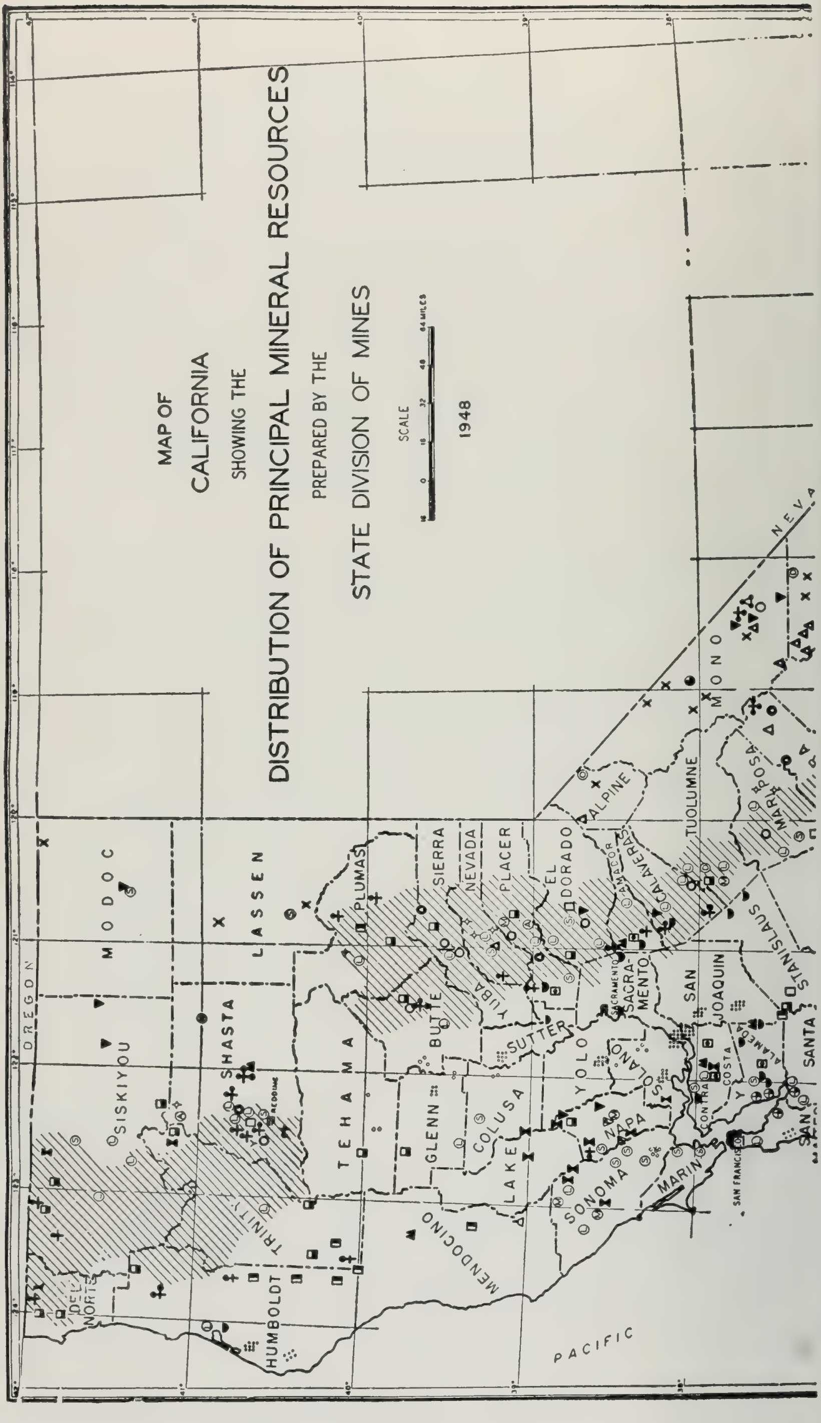
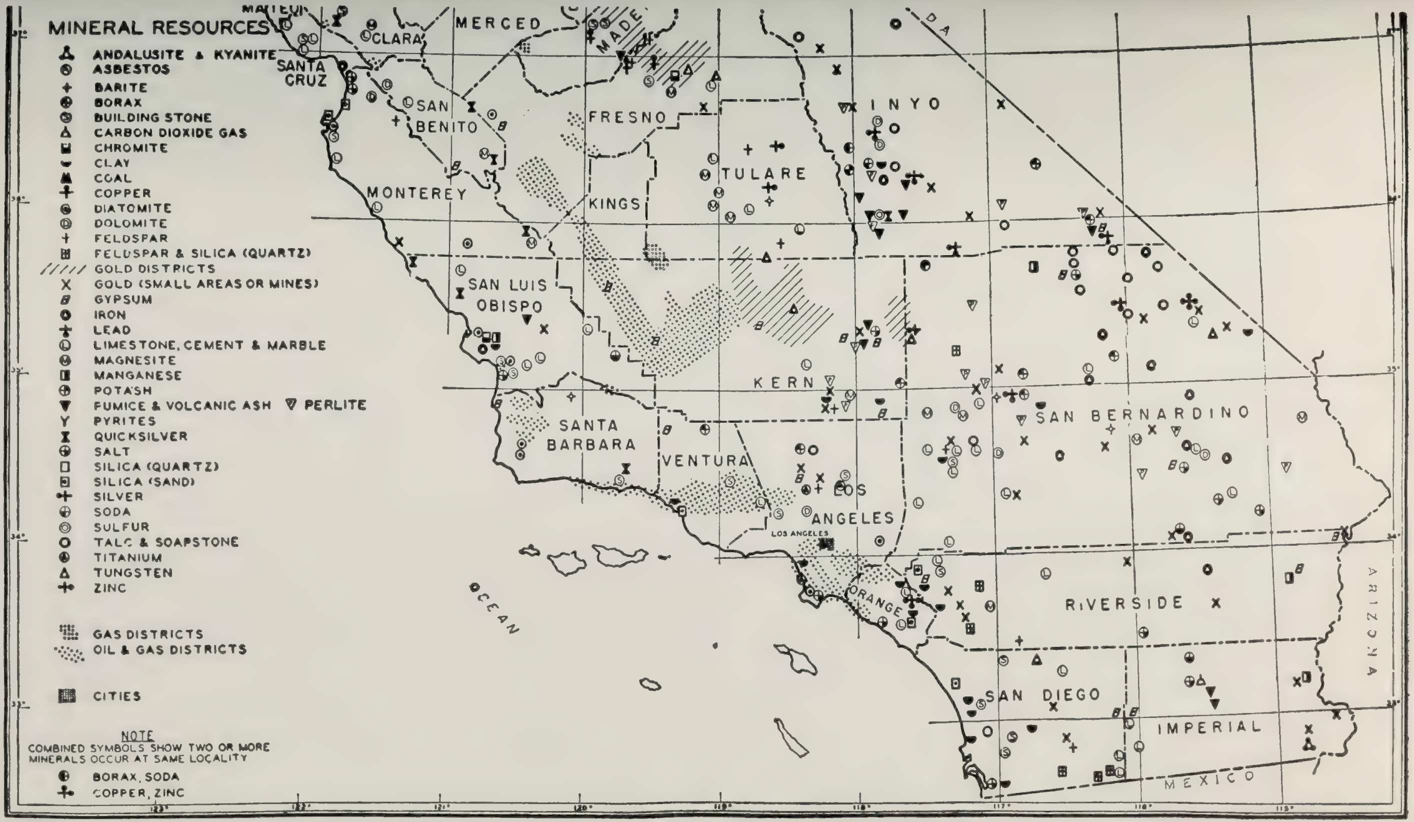
In addition to oral conferences in the offices of the Division of Mines, information concerning the mineral resources, mineral industry, geology, and mining operations of California is distributed to the public by means of publications, monthly releases, and letters. Each letter of inquiry received by the Division is answered by the technical staff member best qualified to do so.

The principal publications of the Division of Mines are **Bulletins, Special Reports**, and the quarterly **California Journal of Mines and Geology**, issued in January, April, July, and October of each year. **Mineral Information Service** is a monthly news release concerning the mineral resources and industry of California, designed to inform the public of discoveries, operations, markets, statistics, and new publications. A list of available publications will be sent free upon request.


MAP OF
CALIFORNIA
SHOWING THE
DISTRIBUTION OF PRINCIPAL MINERAL RESOURCES
PREPARED BY THE
STATE DIVISION OF MINES
SCALE
0
16
32
48
64 MILES
1948
OREGON
NEVA
PACIFIC
DEL NORTE
SISKIYOU
MODOC
SHASTA
LASSEN
REDDING
TRINITY
HUMBOLDT
TEHAMA
PLUMAS
BUTTE
SIERRA
NEVADA
PLACER
YUBA
SUTTER
GLENN
COLUSA
MENDOCINO
LAKE
YOLO
SONOMA
NAPA
SOLANO
MARIN
SAN FRANCISCO
CONTRA COSTA
ALAMEDA
SACRAMENTO
SACRA-MENTO
EL DORADO
AMADOR
ALPINE
CALAVERAS
TUOLUMNE
MONO
MARIPOSA
SAN JOAQUIN
STANISLAUS
SANTA
SAN


MINERAL RESOURCES
ANDALUSITE & KYANITE
ASBESTOS
BARITE
BORAX
BUILDING STONE
CARBON DIOXIDE GAS
CHROMITE
CLAY
COAL
COPPER
DIATOMITE
DOLOMITE
FELDSPAR
FELDSPAR & SILICA (QUARTZ)
GOLD DISTRICTS
GOLD (SMALL AREAS OR MINES)
GYPSUM
IRON
LEAD
LIMESTONE, CEMENT & MARBLE
MAGNESITE
MANGANESE
POTASH
PUMICE & VOLCANIC ASH
PERLITE
PYRITES
QUICKSILVER
SALT
SILICA (QUARTZ)
SILICA (SAND)
SILVER
SODA
SULFUR
TALC & SOAPSTONE
TITANIUM
TUNGSTEN
ZINC
GAS DISTRICTS
OIL & GAS DISTRICTS
CITIES
NOTE
COMBINED SYMBOLS SHOW TWO OR MORE MINERALS OCCUR AT SAME LOCALITY
BORAX, SODA
COPPER, ZINC
MATEO
SANTA CRUZ
CLARA
SAN BENITO
MONTEREY
MERCED
MADERA
FRESNO
KINGS
TULARE
INYO
SAN LUIS OBISPO
SANTA BARBARA
VENTURA
KERN
LOS ANGELES
SAN BERNARDINO
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL
ARIZONA
MEXICO
OCEAN
LOS ANGELES
DA
123°
122°
121°
120°
119°
118°
117°
116°
115°
32°
33°
34°
35°
36°
37°

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PLATES

Economic Mineral Map of California No. 7, Lead and Zinc---In pocket

LEAD AND ZINC IN CALIFORNIA

By J. Grant Goodwin *

OUTLINE OF REPORT

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ABSTRACT

Oxidized lead-zinc-silver ores in the desert ranges of southeastern California were first worked for their silver content. The zinc-copper ores of the Sierra Nevada foothill belt and the Shasta district were discovered below iron-rich gossans which were being worked for their gold content. From 1871 through 1953 California mines have yielded 447 million pounds of lead of which Inyo County has accounted for 94 percent. Of this total, 50 percent has been produced since 1942. California's annual production of lead since 1942 represents about 2 percent of the annual national total production. Through 1953 the total zinc production was 267 million pounds of which 55 percent came from the Shasta district, 28 percent from the Basin Ranges of southeastern California, and 15 percent from the Sierra Nevada foothills.

The occurrence of commercial lead and zinc in California is confined largely to three geological environments, (1) faulted carbonate rocks of the Basin Ranges of southeastern California, (2) zones of shearing in metavolcanic rocks along the Sierra Nevada foothills, and (3) fractured porphyritic rhyolite in the Shasta area. Other occurrences of minor importance are the contact deposits and high temperature fissure veins within metamorphic roof pendants in the high Sierra Nevada, and the minor base metals which occur with the precious metals throughout the base metal districts, along the Mother Lode, in the East belt, and the Klamath Mountains.

Five distinct mineralogical types of lead and zinc ores have been recognized in California. These are: (1) lead-zinc replacement bodies in the carbonate rocks of the Basin Ranges of southeastern California and in the Mojave Desert, (2) silver-lead-zinc ores of the same districts, (3) zinc-copper, massive and disseminated sulfides in the metamorphic and volcanic rocks of the Sierra Nevada foothills and the Shasta district, (4) complex copper-gold-lead-silver-zinc contact deposits and high temperature fissure veins which occur mainly in the high Sierra Nevada and in eastern San Bernardino County, and (5) precious metal deposits.

Distinct environments of deposition are recognized in the various districts. Structural and mineralogical settings are fairly constant within each of the districts. In the Basin Ranges and Mojave Desert silicated carbonate rocks are the principal hosts. Selective replacement of silicated and dolomitized rock is evident. The principal structural settings are fault blocks, igneous contacts, and thrust faults. In the Sierra Nevada foothills zinc and copper sulfides selectively replace pyritized and silicified metavolcanic rocks along the foothill shear zone which marks a major break between the uplifted Sierran block and the down-dropped geosyncline which forms the Great

---

* Mining geologist, California Division of Mines, San Francisco. Manuscript submitted for publication November 1955.

Valley of California. In the Shasta district massive zinc-copper sulfides occur along high angle faults, horizontal tension openings, and selective beds in porphyritic rhyolite.

The mining and processing of the various types of ore differs widely. Zinc-copper ores have required milling and flotation to produce marketable concentrates. Heavy ground at most deposits has required much timbering and back filling. The lead-zinc-silver ores have, in the past, been of shipping grade; however, in recent years flotation following sulfidization of the oxidized ore has been used on the large low grade deposits. Because the carbonate rocks stand well without timbering, open stopes predominate. The selective mining of shipping grade ore at the smaller deposits has resulted in very irregular workings and the abandonment of low grade ore in old workings. The precious metal deposits, in general, occur in badly fractured ground and square-set timbering and back filling have been required. Base metals recovered from these ores have come from concentrates and high grade ore shipped to smelters. Most of California's lead-zinc ore and zinc concentrate have been smelted in Utah. Zinc and copper concentrates from zinc-copper ores have also been shipped out of state, mainly to Great Falls and Tacoma. The bulk of the precious metal ores and concentrates as well as a portion of the high grade lead ores and concentrates have been smelted in California at Selby.

INTRODUCTION

Documentary information on lead and zinc mining in California is widely scattered through scientific literature, commercial files, and publications of the State and Federal governments. The purpose of this report is to bring together the available information, and to present it in abstracted form in order to encourage systematic development of California lead and zinc resources.

Detailed descriptions of most of the old mining camps are lacking and, commonly, the only available information consists of statistics on production. During the national emergency of World War II the Federal government, through the facilities of the U. S. Geological Survey and U. S. Bureau of Mines, began a program of exploration for critical minerals. Systematic examination of potential copper producing areas began; mines along the Foothill belt were mapped in detail, and some were diamond drilled. The results of these examinations were published in 1948 in California State Division of Mines Bulletin 144, prepared under the direction of Olaf P. Jenkins. This volume is a comprehensive report on the zinc-copper deposits of the Sierra Nevada Foothill belt. Another cooperative work program between California Division of Mines and the U. S. Geological Survey has been a study of the zinc-copper deposits of the Shasta district. California Division of Mines Special Reports on four massive sulfide deposits have been published to date (Kinkel and Albers, 1951, Kinkel and Hall, 1951, Kinkel and Hall, 1952, Albers, 1953) and the entire project is nearing completion. Further work under the cooperative program is in progress along the Sierran Foothills, in the high Sierran region, and in the Basin Ranges. The Darwin quadrangle has been mapped and detailed work has been done at the Cerro Gordo mine, (Merriam, 1949), Santa Rosa mine (Mackevett, 1953) and Lippincott mine (McAllister and Mackevett, 1949) in the Ubehebe district. Other lead-zinc deposits in this area will be mapped in detail.

The Darwin district has been mapped in considerable detail and the geology and ore deposits described (Kelley, 1938). Except for the above work, detailed mapping has largely been done by operating companies.

During the course of this examination, typical deposits in each of the mineralized districts were examined and known sources of available information were consulted.

Lead and zinc deposits that have proved to be commercial are concentrated in three principal districts; the Basin Ranges of Inyo County, the Sierra Nevada foothills from Fresno County north through Butte County, and in the vicinity of Redding in Shasta County. Other scattered deposits of less importance are located in the eastern portion of the Mojave Desert in Riverside and San Bernardino Counties, in Imperial County, Orange County, on Santa Catalina Island, in the high Sierra Nevada in Mono, Inyo, Madera, Fresno, and Tulare Counties, and in the Mother Lode and East belt gold districts.

The occurrences of lead and zinc in complex mineralogical assemblages makes classification of ore types difficult. For simplicity only two main types have been distinguished on the mineral map and in the tabulated section. These are zinc-copper ores and lead-zinc ores.

The author wishes to acknowledge the assistance and cooperation of the U. S. Geological Survey, U. S. Bureau of Mines, mining companies, and mine owners and operators throughout the state.

HISTORY OF MINING[1]

Lead. The first lead mined in California was by Mormons working silver deposits in the southern Panamint Range, Inyo County. The rich silver-lead deposits of Cerro Gordo, discovered by Mexicans in 1862, were first worked primarily for silver; ore was smelted in vasos. In 1869, American interests erected two smelters at the mine and a third smelter at Keeler on the shore of Owens Lake. In 1876 the Santa Maria and Union mines were consolidated to form the famed Cerro Gordo mine. By 1877 the rich oxidized near-surface ores were depleted and activity declined until interest was revived by the completion of the railroad to Keeler about 1880.

Darwin, an equally famous silver camp, was discovered in 1874 and by 1880 several mills and smelters were in operation. Water was piped from the Coso Mountains, a distance of about 8 miles. During the early period when rich oxidized silver ores were being mined, Darwin was a flourishing town of about 5,000 people. The richer ores were soon depleted at both Darwin and Cerro Gordo and a drop in the price of silver in 1893 closed many of the mines.

Subsequent operation at Darwin was intermittent during periods of great demand until 1945 when Anaconda Copper Mining Company purchased the major holdings. Production has averaged 8000 to 10,000 tons of ore per month in recent years.

About 1880, silver-lead ore was discovered on the east flank of the Argus Range in what is now known as the Modoc district. By 1890 the principal mines, the Modoc and Minnietta, had boosted Inyo County's mineral production by $3,000,000.

Zinc. Zinc mining in California began, in part, as an outgrowth of copper mining which in turn resulted from the search for gold in the iron-rich gossans along the Sierra Nevada Foothill belt and in the Shasta district. Mining along the Foothill belt began in 1860 when

---

[1] Brown, 1868; Chalfant, 1933; Heyl, 1948; Hill, 1929; Jenkins, 1950; Kelley, 1938; Knopf, 1912.

Lead and zinc produced in California 1871-1953.

Year	Lead in millions of pounds	Principal source	Zinc in millions of pounds	Principal source
1871-1893	92.86	Inyo 99%		
1894	0.95	Inyo 99%		
1895	1.59	Inyo 99%		
1896	1.29	Inyo 99%		
1897	0.60	Inyo 99%		
1898	0.65	Inyo 99%		
1899	0.72	Inyo 99%		
1900	1.04	Inyo 97%, also San Bernardino		
1901	0.72	Inyo 97%, also San Bernardino		
1902	0.35	Inyo 97%, also San Bernardino		
1903	0.11	Inyo 97%, also San Bernardino		
1904	0.12	Inyo 97%, also San Bernardino		
1905	0.45	Inyo 97%, also San Bernardino		
1906	0.34	Inyo 60%, also San Bernardino, Los Angeles	0.21	Foothill belt, also Inyo
1907	2.62	Inyo 98%, also San Bernardino, Los Angeles	0.23	Inyo
1908	1.24	Inyo 90-95%, also San Bernardino		
1909	1.50	Inyo 90-95%, also San Bernardino		
1910	2.87	Inyo 90-95%, also San Bernardino		
1911	1.40	Inyo 90-95%, also San Bernardino	2.81	Inyo 93%, also San Bernardino
1912	1.14	Inyo 90-95%, also San Bernardino	4.35	Inyo
1913	3.51	Inyo 90-95%, also San Bernardino	1.06	Inyo 91%, also Shasta
1914	4.25	Inyo 90-95%, also San Bernardino	0.39	Inyo
1915	4.58	Inyo 90-95%, also San Bernardino	13.10	Shasta 64%, Inyo 35%, also San Bernardino
1916	12.41	Inyo 90-95%, also San Bernardino	15.26	Shasta 52%, Inyo 38%, also San Bernardino & Foothill belt
1917	21.87	Inyo 90-95%, also San Bernardino	10.87	Shasta 58%, Inyo 36%, also San Bernardino & Foothill belt
1918	13.37	Inyo 90-95%, also San Bernardino, Shasta	5.56	Shasta 55%, Inyo 45%
1919	3.57	Inyo 90-95%, also San Bernardino, Los Angeles	0.47	Inyo 47%, Foothill belt 35%, Shasta 17%
1920	4.81	Inyo 90-95%, also San Bernardino, Los Angeles, Shasta	1.17	Inyo and Shasta
1921	1.12	Inyo 90-95%, also San Bernardino, Los Angeles, Shasta	0.85	Shasta
1922	6.31	Inyo 99%, also San Bernardino, Los Angeles	3.01	Shasta 98%, also Inyo
1923	9.55	Inyo 99%, also San Bernardino, Los Angeles		
1924	4.76	Inyo 99%, also San Bernardino, Los Angeles	3.06	Shasta
1925	6.57	Inyo 95%, also San Bernardino, Los Angeles	11.49	Shasta 96%, also Los Angeles, Inyo, Orange
1926	8.09	Inyo 82%, also Los Angeles, San Bernardino, Shasta	20.43	Shasta 87%, Los Angeles 12%, also Inyo, Orange
1927	2.70	Inyo 82%, also Los Angeles, San Bernardino, Shasta	8.00	Shasta, also Los Angeles
1928	1.90	Inyo 90-95%		
1929	1.40	Inyo 90-95%		
1930	3.56	Inyo 95%		
1931	3.76	Inyo 95%	0.16	Nevada
1932	2.42	Inyo 87%, also Mother Lode		
1933	0.76	Inyo 62%, also Mother Lode	0.29	Inyo
1934	0.82	Inyo and Mother Lode	0.72	Inyo
1935	0.32	Inyo 83%, also Mother Lode		
1936	0.96	Inyo and Mother Lode		
1937	2.37	Inyo 87%		
1938	0.99	Inyo		
1939	1.01	Inyo		

Lead and zinc produced in California 1871-1953.—Continued.

Year	Lead in millions of pounds	Principal source	Zinc in millions of pounds	Principal source
1940	3.54	Inyo	0.16	Inyo
1941	6.90	Inyo 77%, also Riverside	0.88	Inyo
1942	10.30	Inyo 98%	1.23	Inyo
1943	11.64	Inyo 98%	3.70	Inyo and Foothill belt (Butte and Calaveras)
1944	11.36	Inyo 88%	16.90	Foothill belt[1], Shasta, Inyo
1945	14.45	Inyo 90%	19.85	Foothill belt[2], Shasta, Inyo
1946	19.85	Inyo 94%	13.75	Foothill belt[3], Shasta, Inyo, also San Bernardino
1947	20.20	Inyo 89%, also Shasta	10.80	Foothill belt[3], Shasta, Inyo, San Bernardino
1948	18.20	Inyo 95%	10.70	Inyo, also Shasta
1949	20.60	Inyo 96%	14.40	Inyo and Shasta
1950	31.70	Inyo 98%	15.10	Inyo and Shasta
1951	28.10	Inyo 99%	20.00	Inyo and Shasta
1952	22.40	Inyo 99%	18.84	Inyo 64%, Shasta 26%
1953	17.50	Inyo 99%	10.60	Inyo

[1] Mariposa, Butte, and Calaveras.
[2] Mariposa, Calaveras, Butte.
[3] Calaveras.

PHOTO 1. The Kelly, or California Rand mine, Randsburg district, San Bernardino County. *Photo by Mary R. Hill.*

Quail Hill was located as a gold prospect. Below the gossan, rich copper ores were found and the enriched ores were shipped to Swansea, Wales, for smelting. By 1863 the Napoleon, Empire, Union, Keystone, North Keystone, Campo Seco, Lancha Plana, Copper Hill (present site of Penn mine), and the Newton mines had been discovered. These discoveries were soon followed by the Spenceville, Collier, La Victoria, Green Mountain, Lone Tree, and Buchanan, and copper mining along the Foothill belt was in full swing. Most of the enriched copper ore had been mined out by 1867, and between 1868 and 1881 most of the mines were inactive because of the high cost of freight to Swansea and the decrease in gold-silver content below the gossans. Not until 1906 was zinc recovered from the Foothill copper ores; previously, it was considered a nuisance. Copper ore had to average 15 percent copper to pay expenses to Wales. Activity revived slightly in 1882 and again in 1902 to 1920 and 1924 to 1930. Government subsidies and cooperation in exploration revived the Sierra Nevada Foothill belt during World War II and more than 25,000,000 pounds of zinc and 22,000,000 pounds of copper were produced between 1942 and 1946. About 12 complex sulfide mines in 8 counties along the Foothill belt were in operation using improved selective flotation methods. Two new zinc mines were developed as a result of diamond drilling of gossans in the Foothill belt by the U. S. Bureau of Mines. These were the Blue Moon mine in Mariposa County and the Big Bend mine in Butte County. Total production of the Foothill belt from 1860 to 1946 was more than 200 million pounds of copper and 40 million pounds of zinc in addition to a large gold-silver, and minor lead recovery.

Copper mining in the Shasta district began in 1894. The Keswick smelter was erected to treat ores from the Iron Mountain mine. In 1904, U. S. Smelting Mining and Refining Company took over the Mammoth, Balaklala, and Keystone mines and built a smelter at Kennett which operated until 1924. Zinc was not recovered from Shasta County copper ores until 1913 and no significant production resulted until 1915 when General Electric Company built an experimental electrolytic zinc plant at Winthrop. The recovery of this plant was 300 to 400 pounds of zinc per day. Between 1917 and 1918 electrolytic zinc was produced from smelter fumes by Mammoth Copper Company at the Kennett smelter. In 1918 electrolytic zinc was being produced at the Winthrop plant from zinc-rich ores from the Afterthought and Bully Hill mines. Milling of Bully Hill and Afterthought zinc-copper ores was unsuccessful as the copper concentrates contained too much zinc. In June 1922, Shasta Zinc Company built a reverberatory furnace and zinc oxide plant at Bully Hill to treat these complex ores. The plant operated until December of the same year when the price of zinc oxide dropped. The California Zinc Company took over the operation of the Afterthought and Bully Hill mines in 1924 and abandoned the smelting and zinc oxide operations. This company shipped a bulk concentrate containing 43-49 percent zinc, 3.7-4.1 percent copper, 7-11 percent iron, 1.3-1.7 percent lead, and 2.3 percent silica to Belgium for treatment. During this same period concentrates from the Black Jack mine on Santa Catalina were also being shipped to Belgium. By 1928 a drop in the price of zinc closed most of the Shasta County mines as well as the Sierra Nevada Foothill mines.

From 1928 to 1943 the entire zinc production was from lead-zinc ores in southern California.

Zinc mining as such in California began at the Cerro Gordo mine in 1907 when large bodies of secondary zinc carbonate were found in the footwalls of the old lead stopes. Between 1911 and 1915 a large tonnage of pure zinc carbonate was mined. By 1949 this mine had yielded more than 23 million pounds of zinc. With the exception of those from the Cerro Gordo mine, shipments of straight zinc ore have been rare. At many mines zinc ore was left in the stopes since it could not be mined profitably. Not until the advent of selective flotation did zinc become an important by-product or co-product in lead-silver-zinc ores and in copper-zinc ores.

GENERAL GEOLOGY OF THE MINING DISTRICTS IN RELATION TO LEAD AND ZINC

Basin Ranges. The Basin Ranges of California lie at the extreme southwestern edge of a large geomorphic province of fault-block desert ranges that occupies most of Nevada and a large part of Utah and Wyoming. The province is characterized by a thick accumulation of carbonate rocks with interbedded slates and quartzites deposited in inland seas that covered the area almost continuously from early Paleozoic to late Mesozoic time. These rocks were folded during the Nevadan revolution in late Jurassic time and large scale thrusting occurred during the Laramide revolution beginning in early Cretaceous time. Thrusting and upbowing was followed by a period of relaxation during mid-Cretaceous time when normal faulting began and small bodies of granitic intrusive rocks were emplaced along lines of structural weakness. Large scale dolomitization of limestone and ore mineralization followed. These normal faults were again active during Miocene time when they served as vents for the outpouring of large sheets of basic to acidic lavas. Basin Range orogeny culminated in Pleistocene times when large normal and reverse movements, along the old faults, brought equilibrium to this large upbowed arch, leaving north-trending fault-block mountains and intervening downdropped basins. These ranges, with their lava-capped back slopes, rise above the alluvium-filled valleys.

The principal metallogenic period in the Basin Range country followed the thrusting and early normal faulting about mid-Cretaceous (?) time. Medium to low temperature replacement deposits of lead-zinc, silver-lead-zinc, and higher temperature contact and vein deposits of complex copper-lead zinc with associated scheelite, as well as part of the siliceous gold-silver veins with associated lead, zinc, and copper, were formed during this time. A less important metallogenic epoch in late Tertiary (Mio-Pliocene) followed a period of unrest during which time lavas capped the embryonic Basin Ranges. This period of metallization appears to be related to the emplacement of small granitic stocks throughout the Basin-Ranges country. The deposits of this period are mainly gold-silver which occur as siliceous veins in altered volcanic rocks or within the small Tertiary (?) stocks. Minor proportions of lead, zinc, and copper sulfides are commonly associated with these ores.

Mines in the Basin-Ranges province in California have produced approximately 94 percent of the lead and 28 percent of the zinc produced in California to date.

Shasta Zinc-Copper District. The Shasta zinc-copper district lies at the north end of the Great Valley of California, in the southwest corner of a large volcanic province which occupies most of Lassen and Modoc Counties. This volcanic province not only obscures the bedrock geology of the northern Sierra Nevada but has hindered correlation of Sierran rocks with those of the northern Coast Ranges and Klamath Mountains.

The Shasta district is divisible into two units, the East and West Shasta districts. This division is not only geographical but lithological and structural as well.

In the West Shasta district Paleozoic meta-volcanic rocks, meta-sedimentary rocks, and interbedded volcanic rocks are folded into a broad arch trending N. 15° E. This faulted arch, which plunges north, is intruded by late Jurassic granite and quartz diorite. Ore occurs as massive sulfide replacements in Balaklala rhyolite of Devonian (?) age. Mineralization is believed to be related to the late Jurassic intrusions (Albers, 1953).

In the East Shasta district Mesozoic volcanic rocks and meta-sedimentary rocks are compressed into a series of asymmetrical folds which trend from N. 70° W. in the eastern part of the district to north or N. 10° E. in the western part (Albers and Robertson, 1952). The district is broken by thrust faults and normal faults trending from north to N. 70° W. Diabase and soda rhyolite dikes intrude the sequence. Massive sulfide replacements occur along shear zones in Bully Hill rhyolite of middle or late Jurassic age. The metallization is believed to be related to deep lying igneous rocks of Jurassic (?) age.

In the Shasta district Coast Range rocks which in general strike north to northeast are in contact with Sierran rocks which strike northwest. This fact may be of critical importance in explaining the apparent structural favorability of this area to mineralizing solutions.

To date, mines of the Shasta district have produced about 42 percent of California's total zinc output.

Foothill Belt. The Foothill belt is defined geographically as a zinc-copper district along the western slope of the Sierra Nevada from Fresno County in the south to Butte County on the north. It marks a zone of faulting and shearing in Paleozoic and Jurassic slates, schists, and meta-volcanic rocks, and marks a major structural break between the Sierran uplift and the San Joaquin-Sacramento Valley. This shearing was part of the sequence of deformation and igneous intrusion that built the Sierra Nevada in late Jurassic time.

Igneous activity began by the intrusion of ultrabasic rocks and ended with the emplacement of the Sierra Nevada granitic batholith with its associated aplitic and pegmatitic dikes. The earlier emplaced basic and ultrabasic rocks were metamorphosed by these later intrusives and by continued deformation. Alteration in the form of chloritization and serpentinization was most common. Locally along shear zones and faults alteration by silicification, pyritization, and sericitization was strong. The sulfides of copper and zinc accompanied and followed the introduction of pyrite along some of these faults. The most favorable rocks for replacement by the sulfides were chloritized and sericitized breccia along shear zones. Local silicification was intense along the entire belt of shearing.

The Foothill belt has been an important source of zinc only during periods of great demand because of the smallness of deposits, refractory nature of the ore, and high cost of transportation. Nevertheless the Foothill belt has contributed more than 40 million pounds, or 15 percent of California's total zinc output. Most of this was produced between 1942 and 1946 under the stimulus of high prices, governmental cooperation, and improved flotation techniques. A large but unproven potential reserve in the form of small, low grade complex deposits probably exists along the Sierran Foothills.

Mojave Desert. The Mojave Desert, which occupies a large portion of San Bernardino and Riverside Counties, is essentially an area of crystalline metamorphic rocks and volcanic rocks intruded by granitic stocks. The province is bounded on the north by the Garlock fault and on the southwest by the Transverse Ranges. To the east it is ill-defined and merges with the Basin-Ranges province where north-south fault block mountains predominate.

Mineralization is almost identical with that of the Basin-Ranges province. Lead-silver-zinc replacement bodies in carbonate rocks are the dominant type. Complex sulfides of copper, lead, and zinc with associated scheelite are scattered through this district and are concentrated in the extreme eastern part of San Bernardino County. Two precious metal districts are of importance in this area; these are the Mojave gold district and the Randsburg silver district. Each has been a source of by-product lead.

To date the mines of the Mojave Desert area have produced an estimated 4 percent of the state's total lead and an estimated $1\frac{1}{2}$ percent of the total zinc production.

High Sierra Nevada. The high Sierra Nevada province includes the western portions of Mono and Inyo Counties, along the Sierran fault scarp, and the eastern portions of Madera, Fresno, and Tulare Counties. The southern Sierra Nevada batholith with its pendants of metamorphic rocks is host to a unique group of contact deposits. Erosion has stripped the metamorphic cover from the batholith; all that remains are the deeply infolded roof pendants. Within the pendants limestone, slate, and schist of pre-Cretaceous age predominate. These rocks have been recrystallized by plutonic and regional metamorphism. Metasomatic changes have been strong in many localities. Slates and schists have been recrystallized and silicified. Limestones have been recrystallized and with the addition of silica have been transformed into a variety of lime silicates.

It is within these zones of strong metamorphism and silication that high temperature contact deposits have formed. Sulfide mineralization is sparse but widely distributed. The principal deposits of this province are complex sulfides of copper, lead, and zinc, often in association with scheelite and minor amounts of gold and silver.

Production from this district has been small and most of the deposits, because of their inaccessibility, haven't been developed beyond the prospect stage. High altitudes and short working seasons have hindered development. Elevations range from 5000 to over 12,000 feet.

Mother Lode. The Mother Lode belt is a zone of reverse faulting and shearing which lies between and parallel to the Foothill belt and the East belt at an average elevation of about 1500 feet. The Paleozoic complex is here overlain by Mesozoic slates and metavolcanic rocks, and is intruded by basic to ultrabasic rocks emplaced prior to the Sierran batholith proper. Small granitic stocks and apophyses from the Sierran batholith are also present and in some localities appear to be genetically related to the gold deposits. The obvious relationship between Mother Lode mines and the belt of basic to ultrabasic rocks is believed to be structural and not genetic. The early basic differentiates appear to have been emplaced along the major breaks which flanked the Sierran uplift on the west side. Silica- and gold-bearing solutions later followed these same lines of weakness. Mineralization in Mother Lode mines as opposed to East belt mines, extends to and beyond the economic limits of mining. The temperature of mineralization, in general, appears to be slightly lower in the Mother Lode. The principal gangue minerals are quartz, chlorite, pyrite, and arsenopyrite. Galena and sphalerite are less conspicuous than in the East belt. Appreciable quantities of lead have been recovered at the Selby smelter near San Francisco from the large volume of gold ores and concentrates produced along the Mother Lode.

East Belt. The East belt gold district lies at an elevation of 2000 to 4000 feet at an average distance of about 8 miles east of the Mother Lode from Mariposa County north through El Dorado County.

Gold-bearing quartz veins at or near contacts between the Sierra Nevada batholith and Paleozoic meta-sedimentary rocks appear to be higher temperature deposits than the Mother Lode proper. Host rocks are both Paleozoic meta-sedimentary rocks and the intrusive granite. Mineralization extends to shallow depths along fractures which appear to be related to cooling and shrinkage along the periphery of the batholith. Lead and zinc sulfides are very conspicuous and the higher-grade gold ores usually contain about 1 or 2 percent lead. Contact minerals such as garnet and epidote are commonly conspicuous gangue minerals and some of the deposits contain appreciable amounts of scheelite.

The production of lead from the East belt has been small but constant, and has been obtained both from concentrates and from high-grade ores which were shipped to the smelter at Selby.

MINERALOGY OF DEPOSITS AND ENVIRONMENTS OF DEPOSITION

Mineralogic Types

Lead-Zinc. The lead-zinc and zinc-lead deposits of the Basin-Ranges province and eastern portion of the Mojave Desert are by far the most important producers in California. They have accounted for 94 percent of the lead and 28 percent of the zinc produced in California. The apparent predominance of lead over zinc is misleading because most of the deposits contain equal amounts of lead and zinc. Prior to 1900 lead was mined selectively and zinc-rich ores were avoided and left in the stopes. Of the ore mined and smelted the zinc was not recovered. Most of it went into the slags and much was lost, along with lead, as flue dust. Even now with improved techniques in selective flotation lead-poor ores are marginal and much zinc is being left in the stopes. Many of the early smelter slags ran as high as 15 percent zinc at such camps as Cerro Gordo and Darwin. Zinc always commanded a lower price and the smelting of zinc is complicated and expensive; so much so that the mine operator's return from smelters has discouraged the development of zinc stopes. On the other hand, ores that run exceptionally high in zinc will bear shipping and at some mines zinc has been the principal product.

All lead-zinc and zinc-lead ores contain silver and gold in varying amounts but average less than 10 ounces of silver per ton. Ores with 10 or more ounces of silver can be mined for their silver content alone, during economically favorable periods. Milling grade ores that average about 6 to 8 percent lead contain from 1 to 1½ ounces of silver for each percent of lead. Shipping grade ores (direct smelting) often contain a much higher ratio of silver, for two reasons: 1) most shipping ores are from the oxidized zone where enrichment of silver as well as lead has been brought about by solution and removal of zinc and gangue material, and 2) commonly the ratio of ounces-of-silver to percent-of-lead rises with an increase in the lead content. Darwin and Cerro Gordo, for example, were known primarily as silver camps during the early days when rich oxidized ores were being smelted. If Cerro Gordo were operating today, milling grade ore probably would not exceed 10 ounces of silver. Cerro Gordo's production has been largely from direct smelting ores.

Gold and copper are usually present in variable amounts. Lead-zinc ores do not average more than 0.08 ounces of gold and 0.25 percent copper. Copper content appears to be inversely proportional to the zinc content. In ores with 1 percent or more copper, zinc is commonly subordinate to lead and the gold value commonly exceeds the silver value. These are, in general, higher temperature deposits, either contact or fissure vein.

The principal primary ore minerals in lead-zinc deposits are galena and sphalerite, with associated argentiferous galena, auriferous chalcopyrite and pyrite. In the oxidized zone sphalerite and chalcopyrite are rare; usually zinc and copper have been largely removed but may be present in the form of smithsonite, calamine, malachite, and azurite. Galena may persist, even in the outcrop; however, most of it is changed to anglesite, and finally to cerussite. Silver may remain in the oxidized zone as finely divided native silver or as silver chloride or silver bromide, however it may be transported out of the oxidized zone in the form of soluble silver sulfate (in the absence of halogen ions) and eventually be redeposited as a chloride, bromide, iodide, or as native silver.

Carbonate rocks in the vicinity of granitic intrusions are the common host for these deposits. Regional and plutonic metamorphism with varying degrees of metasomatism preceded ore deposition. The usual chain of events has been folding, faulting, and regional metamorphism of the carbonate rocks, followed by igneous intrusion, silicification, silication, and dolomitization especially at contacts and along major faults. Ore deposition followed; in many districts minor adjustment along faults was still going on. Ore bearing solutions also contained silica, manganese, iron, and in some localities fluorine and barium. These solutions followed the same planes of weakness followed by the earlier dolomitization and silicifying solutions. The formation of the lime-iron silicates such as epidote, garnet, diopside, and wollastonite, was generally confined to the contact zones. In general the high temperature deposits formed here are higher in pyrite and chalcopyrite and some contain scheelite. Along the major faults away from igneous contacts replacement bodies of argentiferous galena and sphalerite were formed. These bodies preferentially replace dolomitized limestone and in many deposits the solutions moved out laterally from the major faults and replaced fresh limestone along flat-lying tension openings and favorable beds.

The net result is, in general, high temperature contact deposits of galena and sphalerite, with some chalcopyrite and pyrite, in a lime-silicate gangue along contacts; and massive replacement bodies of galena and sphalerite, with more silver and less chalcopyrite, in a gangue of dolomitized limestone, jasper, manganese oxide, and in some localities fluorite and barite. Fissure veins and bedding-replacement deposits are found at some distance from the major faults in recrystallized limestone, beyond the dolomitized zone.

Silver-Lead-Zinc. Lead-zinc ores rich in silver attracted the first miners to the desert ranges of California about 1859. The richest, near-surface ores were mined selectively and crudely smelted to extract their silver. With the exception of these early ores, which were also high in lead, silver-lead-zinc ores have largely depended on their silver content to meet shipping-grade requirements. Two extremes exist within this classification; extremely rich silver ores where lead is insignificant as at Blind Spring Hill, Mono County, and shipping-grade lead ores where a moderate silver content is strictly a bonus as at the Modoc mine, Inyo County. Intermediate between these two extremes fall most of the deposits with moderate grade lead ores which depend on a silver content of 10 ounces or more to pay for shipping. Thus silver-lead-zinc ores grade into lead-zinc ores with a decrease in silver, and at the other extreme grade into gold-silver deposits where only the precious metal content is significant.

Generally the silver mineral in the primary ore is not identifiable and it is commonly assumed that the silver is locked in the galena molecule in solid solution. The silver is discernible only in the highly oxidized ores where it occurs as native silver. Argentite, the sulfide of silver, has been identified in many primary ores, but not in sufficient quantity to account for the overall silver content.

Distinct groups of high silver ores are recognized at camps such as Blind Spring Hill, Mono County, the Randsburg district in San Bernardino County, and Cerro Gordo in part (the San Felipe vein). These various hybrid types do not fall neatly into any scheme of classification. The principal primary silver minerals are freibergite, argentite, and the complex silver-sulfosalts. In general these ores appear to be later than the formation of the principal lead-zinc deposits. The San Felipe vein at Cerro Gordo cuts the lead-zinc bodies at an acute angle. The vein is siliceous in nature and barite is conspicuous in the gangue. The principal primary silver mineral is freibergite. Mineralogy of the Blind Spring Hill veins is very similar; however, the wall rock is granitic. Freibergite, or argentiferous tetrahedrite, has been identified in a barite gangue at many of the lead-zinc mines with high silver content. With more detailed work in the old districts, further classification might be warranted.

The silver-lead-zinc deposits are scattered through the Basin-Ranges and Mojave Desert provinces. Some occur in the High Sierra province along with lead-zinc ores, where they grade into complex ores at and near igneous contacts where chalcopyrite is common. A small cluster of lead-zinc and silver-lead-zinc mines also occurs in Shasta County around Igo and Ono, and in the Cow Creek and Battle Mountain district in Permian and Triassic limestone near late Jurassic intrusives.

Zinc-Copper. The intimate association of sphalerite, chalcopyrite, and pyrite distinguishes these ores from all others whether they occur in massive sulfides as in the Shasta district or as disseminated sulfides along shear zones as in the Foothill belt.

Exploitation of these deposits began in 1860 when the large gossans were worked for gold. Enriched copper ores below the gossans led to eventual development of the primary sulfides at depth. The refractory nature of complex ores hindered their exploitation until the advent of selective flotation.

The primary ore contains an intimate mixture of fine-grained sphalerite, chalcopyrite, and pyrite. Galena, gold, and silver are minor constituents. The average grade of such ores is 8 to 14 percent zinc, 1.25 to 3.25 percent copper, 1 ounce to 5 ounces of silver, 0.016 to 0.065 ounce of gold, and up to 2 percent lead. Generally lead is much lower.

A hybrid type of apparently higher temperature origin does exist in which chalcopyrite predominates and sphalerite content is low. Pyrrhotite is present and may substitute for pyrite entirely. The gold content rises proportionally with the copper, and silver is lower than in the normal zinc-copper ores. These deposits grade into straight copper ores. Island Mountain in Trinity County is a classic example of this hybrid type.

Copper is persistent throughout the Foothill belt, zinc less so. Heyl (1948) has divided the Foothill copper ores into the following four classes:

(1) "Deposits made up of sphalerite, chalcopyrite, and pyrite, generally with small amounts of galena and appreciable quantities of gold and silver. Examples: Big Bend mine, Butte County; Penn mine and Quail Hill mine, Calaveras County; Blue Moon mine, Mariposa County.

(2) "Deposits consisting mainly of pyrrhotite and chalcopyrite, with or without pyrite and sphalerite, and generally with some gold or silver. Examples: Green Mountain mine, Mariposa County; Buchanan mine and Daulton mine, Madera County; Fresno copper mine, Fresno County.

(3) "Deposits of pyrite and chalcopyrite, with practically no gold or silver, and with zinc minerals being absent or virtually so. Examples: Newton mine, Amador County; North Keystone mine and Keystone-Union mine, Calaveras County.

(4) "Deposits composed of chalcopyrite, pyrite, and quartz, with or without sphalerite and pyrrhotite, and generally with some gold and silver. Examples: Eldorado copper mine, El Dorado County; La Victoria mine, Mariposa County; Jesse Bell mine, Madera County."

In the Shasta district the mineralogy of the ores is very similar to that of the Foothill ores and the tectonic and plutonic history is essentially the same. The Shasta district may be considered the northwestern extension of the Foothill belt.

The ore deposits of the Shasta District occur along steep-dipping shear zones and along flat-lying bedding shears and tension openings between steep-dipping normal and reverse faults. All of the larger deposits occur in porphyritic rhyolite at or near its contact with non-porphyritic rhyolite or tuff of different relative competency. Structurally and chemically the Bully Hill and Balaklala porphyritic rhyolites appear to have been exceedingly favorable hosts for ore-bearing solutions.

Complex Ores. Complex ores occur as contact metamorphic and high temperature fissure vein deposits. The primary ore minerals are chalcopyrite, galena, and sphalerite, with appreciable gold and silver. Scheelite is common.

The contact metamorphic deposits generally occur in tactite at limestone-granite contacts or in silicified meta-sediments in contact with granite. The common gangue minerals are lime-iron silicates, crystalline calcite, magnetite, pyrrhotite, and pyrite.

The high temperature fissure veins are siliceous in nature and gangue minerals differ with the host rock. In limy rocks the gangue minerals are usually the same as in the contact metamorphic deposits. In siliceous meta-sediments and igneous rocks, the gangue may be restricted principally to pyrrhotite, pyrite, magnetite, and hematite.

Deposits of this class are generally small and have been worked in the oxidized zone primarily for their gold content. They have not been significant lead or zinc producers and where copper content is less than 1 percent and gold accounts for the principal value, they have been classed as precious metal mines.

High lead-zinc ores with 1 percent or more copper have also been placed in this classification because of their possible genetic relationship to high temperature mineralization. This relationship is demonstrated by the eutectic intergrowth of chalcopyrite in sphalerite, and by the character of the gangue minerals. The large lead-zinc replacement deposits are conspicuously lacking in chalcopyrite except in the contact zones where it may be accompanied by scheelite. Many of these deposits were located originally as gold mines and ore from the oxidized zone was cyanided. Some operators have shipped ore to copper or precious metal smelters. The average tenor of such ores has been about 3.5 percent copper, 7.8 percent lead, 12 ounces of silver per ton, 0.1 to 0.4 ounce of gold per ton, and minor zinc. Where gold exceeded this amount and ore was obviously mined for its precious metal content, the deposits have been classed as precious metal mines.

A great number of these deposits have recently been prospected for tungsten, particularly in eastern San Bernardino County and Atolia and Pine Creek tungsten mines may be included here.

These deposits are restricted mainly to the High Sierra Nevada province and the Mojave Desert province in the eastern portion of San Bernardino County adjacent to Arizona. They also are found near intrusives throughout the Basin Ranges province. Other scattered localities occur in Alpine, Nevada, and Plumas Counties. The concentration of these deposits in eastern San Bernardino County appears to represent the western fringe of the great copper district of the southwest United States.

Precious Metal Deposits containing Lead and Zinc. All gold mines and silver mines known to contain galena and sphalerite have been included in the tabulated section. Most of them have produced some by-product lead from ores and concentrates smelted. Little or no zinc has been recovered because most ores and concentrates were shipped to smelters not equipped to recover zinc. Total production from these siliceous ores has been small but the fact that many early gold mines later developed into base-metal mines seems to warrant their inclusion here.

Three subdivisional types of precious metal deposits are considered: siliceous gold-bearing veins in base-metal districts, the late Jurassic (?) gold-quartz veins in the Mother Lode, East belt, and Klamath Mountains, and siliceous silver and gold veins of Tertiary age.

The siliceous veins in base-metal districts are by far the most important because their potential of producing lead, zinc, and copper is greater than all other precious metal deposits. Most of these deposits occur in the Mojave Desert and Basin Range provinces. Siliceous gold bearing veins at and near the intrusive contacts contain various proportions of the base metals. They appear, in general, to have formed later than the lead-zinc replacement deposits, in the cooled and fractured portions of the Basin Range stocks. The maximum base-metal content is 3 percent copper and 10 percent combined lead-zinc.

The late Jurassic (?) or early Cretaceous gold-quartz veins of the Mother Lode, East belt, Nevada City-Grass Valley district, and Klamath Mountains have contributed a significant amount of lead, especially during the 1930's when the production of gold ore was high. Galena is much more abundant in the East belt and Nevada City-Grass Valley districts, and in places forms the principal metallic gangue along with pyrite. Mother Lode ores more commonly have less galena and sphalerite, and more pyrite and arsenopyrite. The maximum base-metal content of these ores is about 1 percent combined copper-lead-zinc.

Three gold mines in Nevada County are known to have produced more than 100,000 pounds of by-product lead; these are the Empress, Lava Cap and North Star. The Spanish mine in Nevada County has produced more than a million pounds of combined lead-zinc. The Alabama mine in Placer County and the Central Eureka mine in Amador County have also produced over 100,000 pounds of lead-zinc. The Hazel Creek mine in the East belt district of El Dorado County is currently producing a substantial amount of by-product lead.

The precious metal deposits of Tertiary age in California are in general restricted to the late-Tertiary volcanic areas. These deposits are of no consequence in regard to base metals. Most of these deposits are typical epithermal veins with free gold in highly altered volcanic rocks in a gangue of quartz, adularia, jasper, manganese oxides, and iron oxides. Veins that have been worked primarily for silver commonly contain barite in the gangue. The primary silver minerals are generally the complex sulfo-salts. The principal mineral in the oxidized zone is cerargyrite (silver chloride). It seems noteworthy that in the Calico district, San Bernardino County, chalcopyrite, tetrahedrite and pyrite were found in the deepest workings below the rich oxidized silver ore, indicating possible temperature zoning.

Environments of Deposition

Deposits of lead and zinc as well as other metallic minerals, thought to be deposited by ascending hydrothermal solutions, are almost invariably found in channels or receptacles (broken rock and open spaces) of tectonically prepared ground in the vicinity of igneous intrusives. Forces of unrest within the earth's crust are expressed at the surface by long mountain chains of folded and broken strata. Such areas are generally bounded by lines or zones of major faults caused either by failure of the competent strata to yield entirely by plastic deformation, resulting in reverse faults or thrusts, or by subsidence along the flank of an uplifted area resulting in a series of normal and antithetic faults. Igneous intrusives and volcanic invasions take the path of least resistance along these zones of structural weakness and move into the earth's crust.

The universal association of ore bodies with igneous intrusives is in part structural and in part genetic. Heat and vapors from igneous activity play a large role in mobilizing and concentrating metallic elements. The ground is often well prepared by brecciation near intrusive masses, and hydrothermal solutions have easy access to zones susceptible to replacement. The metallic ions may or may not come directly from the cooling magmas though evidence favors this interpretation in many mining camps. The important factors are that permeable ground is available for free movement of metal-bearing solutions. Heat and pressure from igneous sources not only supply a motivating force for the movement of solutions but aid chemical digestion, solution, and various transformations important in mobilizing, transporting, and depositing valuable elements. Occasionally the inherent porosity and permeability of a rock stratum is such that it will act as a favorable aquifer and receptacle for ore-bearing solutions with or without the assistance of tectonic deformation.

Faults. Fault zones within the earth's crust are by far the most common receptacles of metallic ore deposits. It is here that broken and open ground is available. Faults of importance in mineralized areas may be broadly divided into four major groups.

(1) Low angle thrusts; generally a major feature related to diastrophic events preceding batholithic invasion.

(2) Near vertical shear zones; may be a major feature also related to pre-intrusive diastrophism.

(3) Steep-dipping normal and reverse faults related to uplift and subsidence; generally during and after igneous invasion.

(4) Low angle tension openings in blocks bounded by high angle faults; usually contemporaneous with the normal and reverse faulting.

All four types are equally important in ore deposition. The Modoc and Minnietta mines of the Modoc district, Inyo County, in the Basin Ranges province occur along the sole of a large thrust on the east flank of the Argus Range. The Carbonate and Queen of Sheba mines, Inyo County, occur in what appears to be a thrust sheet on the east flank of the Panamint Range. The Goodsprings district in nearby southwestern Nevada is an excellent example of lead-zinc mineralization within a series of overlapping thrusts (Hewett, 1931).

Thrust faults appear to have deep roots which extend to the zone of plastic flow. They have been important channels for ore-bearing solutions throughout the world. Thrust sheets are generally modified by later normal and reverse faults, resulting from subsidence and adjustment. A line of major thrusting extends from southeastern California northeast through Nevada, Utah, and Wyoming. Many of these thrusts, however, are barren of mineralization in the zone exposed to our examination.

Shear zones range from major features such as the Foothill shear zone and the San Andreas zone of faulting and shearing to minor planes of shearing related to local features such as small intrusive bodies. The Foothill shear zone has been deeply eroded since early Cretaceous time and the longitudinal section exposed at the surface is mineralized throughout its entire length. The Foothill zinc-copper deposits owe their origin to this structure. Many of the mines in all of the lead-zinc districts are directly related to shear structures. Some shear zones such as the San Andreas are not mineralized within the zone of accessibility, however.

Normal and reverse faults are generally a smaller, much more common, feature than are thrusts. Zones of en echelon faults may, however, form major features such as the fault-block mountains of the Basin Ranges, and the eastern scarp of the Sierra Nevada. These structures are extremely favorable access channels for ore-bearing solutions since they tend to be open and active at the time mineralizing solutions are in motion. By this means ore-bearing solutions are often transmitted to superficially broken, or otherwise favorable zones of replacement at relatively shallow depths. It is not uncommon that important ore deposits occur within these major normal and reverse faults. The Mother Lode gold deposits are a good example. Deposits of this type generally extend to a considerable depth. Most lead-zinc-silver deposits in California occur, however, along minor normal and reverse faults which are caused by superficial breakage of fault blocks bounded by major faults. A prominent example is the Santa Rosa mine, Inyo County. It is suggestive that pressure and temperature gradients are too low along many major faults to allow deposition.

Horizontal to shallow-dipping tension openings within blocks bounded by steep-dipping faults are minor structural features but are important sites of ore deposition. Flat-lying lead-zinc-silver deposits, known in Mexico and the southwest as ''mantos'' are common. They may occur en echelon, in the vertical plane, in successive antithetic fault blocks which are offset vertically along steep-dipping faults. ''Chimneys'' of ore along the steep faults interconnect some mantos. Tension openings may coincide with bedding planes, thus following inherent planes of weakness. Deposits along fractures coincident to bedding are referred to as ''bedding replacements.'' Deposits of this type are common at most of the lead-zinc-silver mines in the Basin Ranges province. They are generally of greater importance than the steeply dipping fissure vein and chimney deposits. Conspicuous examples of deposits in which mantos-type ore bodies are the most important are the Defense mine and the Lee Flat mine, in Inyo County.

In the East Shasta district, flat-lying deposits of zinc-copper occur along horizontal shears and tension openings between steeply dipping faults; ore bodies occur along bedding planes between porphyritic Balaklala rhyolite and tuffaceous beds. These openings are similar in origin to those in the carbonate rocks of the Basin Ranges.

Folds. Folds control the movement of ore-bearing solutions and the deposition of ore to a lesser degree than do faults. Folding is brought about by compression which is not as conducive to the formation of open spaces and permeable channels. Solutions under great pressure will move through seemingly tight rocks and appear to be confined or guided by fold structures. Minor bedding slippage, which is actually a type of mechanical failure (faulting) probably accounts for this permeability. A relatively impervious bed overlying and infolded with one of greater porosity and permeability, may act as a hood to confine ore-bearing solutions and to restrict their upward movement. Thus anticlinal folds are instrumental in ore control. Where anticlinal structures prevail, as at the Darwin mine, Inyo County, they are usually flanked by major faults and are only partially responsible for ore control. The same is true of the Shasta district where anticlinal structures are flanked by major faults. On a smaller scale, drag folds along faults will show a ''hood effect'' and localize ore bodies. Such an ore shoot, exceedingly rich but small, was found at the Surprise mine, Inyo County.

Favorable Beds. The inherent physical and chemical properties of certain beds may be more instrumental in ore control than are folds. Access to favorable beds is, however, generally via major faults, unless the strata are highly tilted and in direct contact with an intrusive body. Lead-zinc-silver mineralization may occur over a wide horizontal or vertical distance along very narrow beds of susceptible nature. This is true especially in the weakly mineralized areas such as the Mineral King area and the Camp Wishon area, Tulare County, where wide distribution of narrow veinlets occurs. It is also true in the peripheral regions of most major deposits of lead and zinc in the Basin Ranges and Mojave Desert provinces. Where metallizing solutions are weakest they are more apt to demonstrate the favorability of one bed over another. Where replacing power is strong, all beds are replaced.

The universal association of dolomitized limestone with lead-zinc bodies has long been noted. It has been demonstrated that dolomitized limestone has a greater porosity than undolomitized limestone (Hewett, 1928). Silicated limestone in the vicinity of igneous contacts also appears to be more susceptible to replacement by sulfides than nonsilicated limestone. Pyritized zones are definitely susceptible to replacement by sulfides of lead, zinc, and copper. At many lead-zinc replacement deposits, ore will favor one bed over another.

In the Shasta district all important zinc-copper deposits occur in porphyritic rhyolite. The rhyolite made a favorable host rock for several reasons: inherent physical properties were ideal for the formation of horizontal tension openings between major faults; original porosity and permeability were high; and chemically the rhyolite was susceptible to replacement.

In the Foothill belt most of the zinc-copper deposits occur in highly altered meta-volcanic schists although some ore is also found in sheared ''quartz porphyry'' and other rock types.

Igneous Contacts. Igneous contacts rate approximately second in importance to faults in localizing ore deposition in the Basin Ranges of California. This control is apparently both structural and genetic, however indirect the genetic relationship may be. Contact zinc-lead deposits are common throughout the Basin Ranges and Mojave Desert provinces. At many mines lead-zinc ore grades into copper-zinc ore as lead-silver decrease and copper-zinc increase in a relatively higher temperature environment near intrusions. The carbonate rocks are generally silicated forming tactites of garnet, epidote, diopside, tremolite, wollastonite, and crystalline calcite. Scheelite is also common in this environment and a number of the early base-metal prospects are now being prospected for tungsten.

The shape and extent of contact deposits are unpredictable and are usually modified by combination controls of faulting, folding, and lithology. The same factors which control the extent of the tactite zone, such as size of the intrusive, shape of the intrusive, and attitude of the igneous contact, also exert control over base-metal deposition.

Combination Controls. Most commonly ore deposition is controlled by all of the foregoing factors. At Darwin, for example, ore occurs in silicated limestone in the contact zone, as bedding replacement, in fissure veins, and beneath folded structures. Combination controls are the rule, not the exception, and it is usually difficult to determine what the dominating control has been.

MINING, PROCESSING, AND UTILIZATION

Mining

The choice of mining methods to be used at a given mineral deposit is not flexible but is dictated by size, shape, attitude, and strength of the ore body as well as strength and general character of the wall rock. Large scale methods such as open-pit, block-caving and sub-level caving are by far the cheapest mining methods but the size of California deposits has restricted the use of such methods. The glory-hole method of drawing off broken ore from below has been applied on a small scale at some of the larger deposits, and some small-scale open cut mining has been feasible but, in general, more expensive underground methods have been necessary.

Mining Methods. Mining of massive zinc-copper sulfides in the west Shasta district where ore bodies are horizontal has, in general, proceeded from adits where topography permitted. Raises to the ore bodies served as ore passes for stopes developed by overhand and breast stoping. The horizontal stopes allowed the use of slusher-scrapers and eliminated the need for excessive hand shoveling. Stopes developed from winzes were mined by underhand and breast stoping. Steep-dipping ore bodies were developed from adits, where practical, and ore removed by shrinkage stoping where walls were fairly strong. Mining ore shoots along steep-dipping faults where ground was heavy, required square-set timbering. Some timbering was required in all the Shasta mines.

In the East Shasta district at the Bully Hill, Rising Star, Copper City, and Afterthought mines, ore shoots, in general, were steep-dipping. This is true also of the Foothill deposits. The subdued topography made access by shafts and inclines necessary. Where the walls would stand, shrinkage stoping was generally used; where ground was heavy shrinkage stoping was not applicable and much timbering and back-filling were necessary.

Along the Mother Lode and in the East belt, veins are narrow and steep-dipping. Mining, in general, has required access by shafts or inclines, crosscuts to ore, and expensive square-set methods of stoping.

In the Basin Ranges and Mojave Desert where carbonate rocks predominate, walls stand well and require little timbering. Large open-stopes are common, and it is seldom necessary to leave pillars. Mining costs are lower than in the other districts. Shrinkage stoping is usually possible in the steep-dipping ore shoots and ore from large open stopes can be cheaply removed by mechanical equipment. Where topography permits, raises from haulage adits develop the shallow levels. Deeper levels are generally developed from underground shafts via crosscuts.

Most small mines throughout California have been developed by irregular workings because of the necessity to stick close to ore in order to make mining pay as it proceeded. As a result of this unorganized development, low grade ore was left in inaccessible workings. This is true especially where ground is heavy and will not stand without timbering. Abandoned workings soon cave and flood, and because of the lack of mine records and maps, reopening of a deposit for milling-grade ore is usually considered too much of a risk. Diamond drilling of known mineralized districts is usually the best approach to further exploration.

In the desert regions mine openings remain accessible for much longer periods, even where no timbering has been used. Because of this, intermittent operation has been possible. Usually, no great expense is involved in reopening a mine for further exploratory work. Nevertheless, developments have, in large, been confined to shipping-grade ores, and most mine workings followed ore showings. The net result is a very irregular pattern of mine workings with much unexplored ground in the immediate vicinity of known mineralization. It remains for

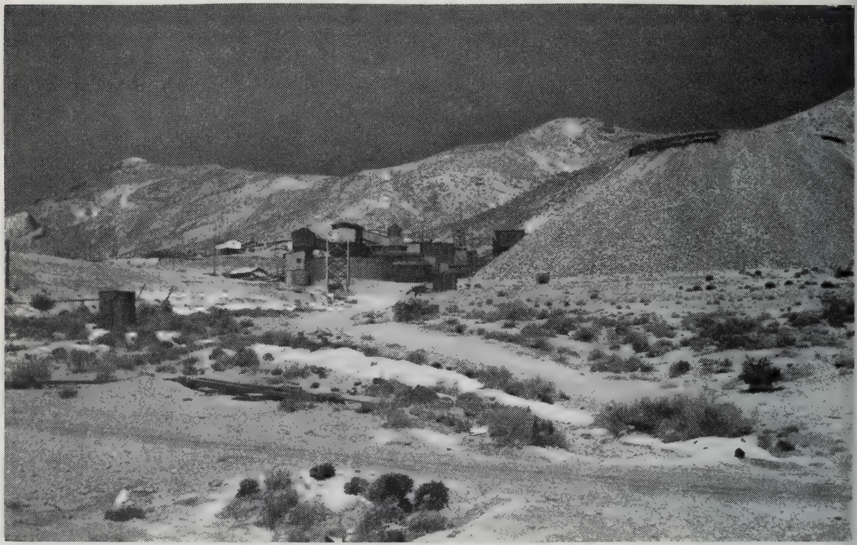

PHOTO 2. Surface plant at Darwin Mines, Darwin, Inyo County, California. *Photo by Mary R. Hill.*

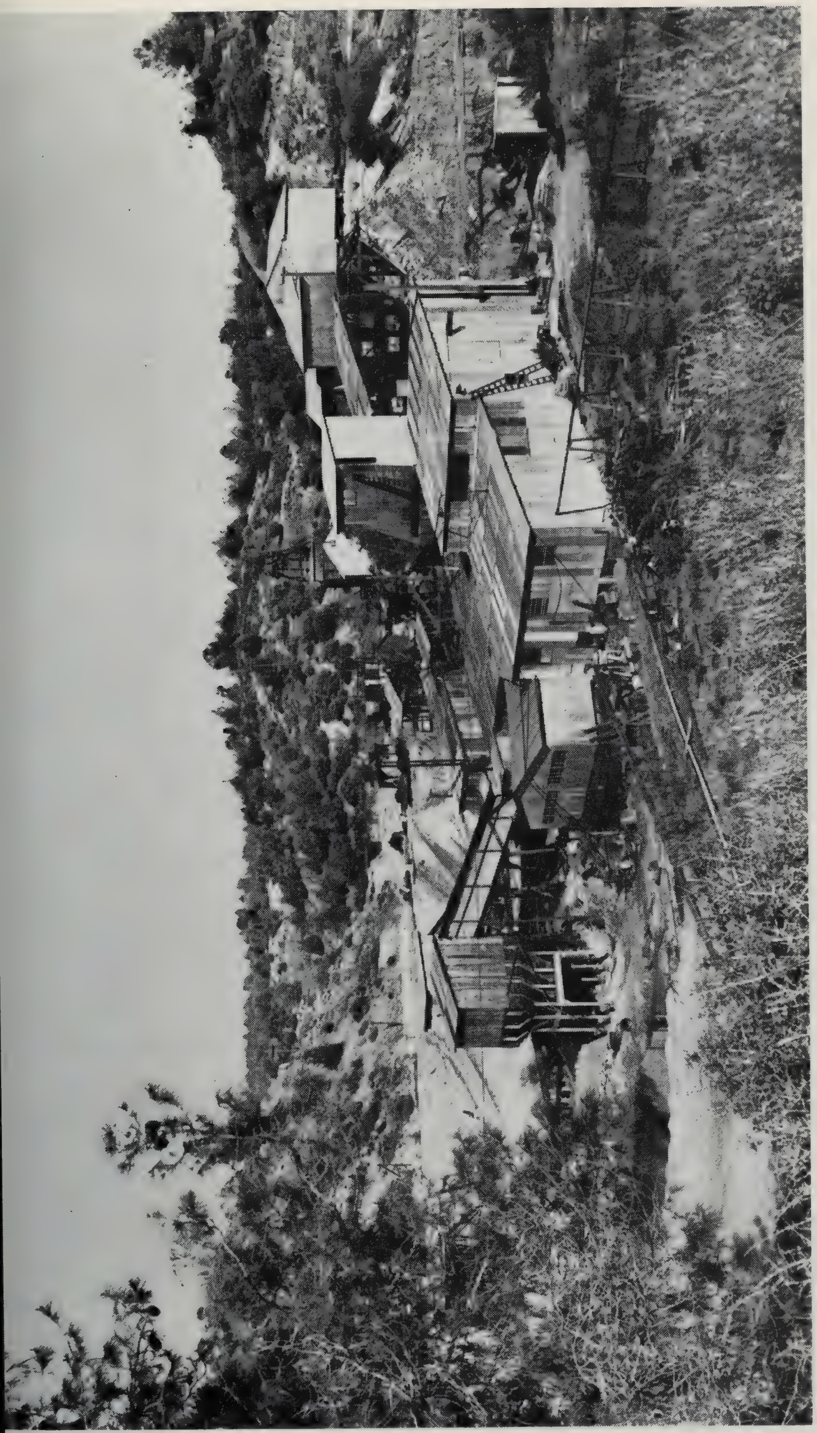

PHOTO 3. Penn mine, Campo Seco, Calaveras County. *Photo by Mary R. Hill.*

organized companies to systematically explore and develop these deposits. The small mine operator usually cannot afford the expense and risk of extensive or intensive underground development.

The economics of mining is no simple matter and many factors influence the decision as to what mining methods are to be employed. The complex zinc-copper ores of the Shasta and Foothill districts must be milled and concentrated to produce a marketable product. If ore is left too long in the stopes, superficial oxidation of the sulfides adds to the difficulty of successfully separating the minerals by flotation. This one reason may be a strong argument against such methods as shrinkage stoping which involves leaving the ore in the stopes for long periods. More than anything else, the small operator has to make regular shipments and elaborate preparations to mine ore must be avoided. By necessity the small operator has practiced a system of ''high-grading'' which has become known as ''chloriding.'' The expression originated in the silver camps where the high grade ore was in the form of silver chloride in the oxidized zone, and the high grade chloride was selectively mined.

The scarcity of water for milling purposes in the desert regions has had a great influence on the development of lead-zinc-silver mining practice. This factor coupled with the smallness of deposits has led to the practice of high-grading to meet shipping requirements. At many of the small mines, selective blasting and hand-sorting is still practiced. Much milling grade ore never reaches the dump, but is left in backfilled stopes and ''dry walls''; only the high grade is hoisted or trammed out.

Shipping Grade Ores. Only rarely will complex zinc-copper ores bear shipping directly to the smelter without benefication. Because of the deleterious effect of zinc to the process of copper smelting, it is heavily penalized and a negative return is realized by the shipper. Only when copper is high enough to bear the freight, pay for the base smelting charge, pay the penalty for zinc, and still bring a profitable return can these ores be shipped directly. During the early copper-mining period when secondarily enriched ores were mined from the oxidized zone, ore was shipped to Swansea, Wales. Ores of this grade are not known in California today. From 2 to 5 percent copper is considered good ore in the primary zone, and zinc is nearly always present in amounts averaging from 7 to 12 percent. This ore is only economical when milled, and separate zinc and copper concentrates made.

Copper and lead do not seriously interfere with each other during the smelting process and for this reason complex ores in which lead predominates over zinc have been profitable to ship directly. It is generally the gold-silver content that makes these ores profitable, however. Where scheelite is present in economic concentrations the ores are now milled to make a separate scheelite concentrate and the copper, lead, and precious metals are recovered in a base-metal concentrate as a by-product.

Gold and silver ores that contain lead may be shipped directly to a precious metal or lead smelter. This is done where gold-silver value is high and not amenable to recovery by amalgamation or cyanidation.

When the gold or silver is finely divided in a silicious gangue or locked n sulfides, it is often more economical to ship directly than to mill. Very finely divided particles are not amenable to amalgamation and urthermore excessive grinding is required to free the particles for ecovery by either amalgamation or cyanidation. Often minerals with a deleterious effect to the cyanide solution will make this form of treatment impracticable. Shipping may be the only alternative.

The lead-zinc-silver ores of southeastern California form the bulk of shipping grade ores. If lead is high and zinc negligible, the ore is hipped to a lead smelter; the zinc is penalized. If zinc is an important onstituent the ore is either shipped to a zinc smelter or combined metal melter. Where lead forms 20 percent or more of the ore it is generally nore economical to ship directly to a smelter than to mill. Shipping rade zinc ore should contain 40 percent or more zinc. Silver and gold ontent may determine whether or not an ore can be shipped profitably. As the precious metal content rises, the percentage of base-metal required to meet shipping grade drops.

Many considerations influence the disposition of ore in the ultimate neans of marketing. Moderate to low grade ores that will bear shipping can usually be milled to show a greater profit. Shipping costs are a very large item and not only is a concentrate less bulky to ship but receives a premium for high metal content at the smelter; separate concentrates are shipped and zinc is paid for also. Each operation has ts individual problems, and it must be determined whether or not millng expenses will be more than compensated for by freight savings and bonus payments. Usually the limiting factor is the proven reserve of ore, or the fact that the ore is not amenable to treatment by milling. A small mine cannot support a large mill, and a small mill costs more (per ton of capacity) to build and operate. Even if a deposit is large, he scarcity of water may prohibit milling.

The problem of what can be shipped at a profit and to which smelter t should be shipped is critical. Smelting is a competitive business and ''open schedules'' are not always closely adhered to. Though the small hipper has little bargaining power, if he is a regular shipper he can usually make special arrangement with a smelter which will give him a better net return than indicated by the smelter's ''open schedule.'' The larger and more regular shipper has correspondingly more bargainng power. By special arrangement with the smelter, even mine dump naterial has been shipped at a profit. Such cases arise when a smelter needs a certain type of ore to add to the furnace charge in order to orm the proper slag. A lead or precious metal smelter rarely finds a need to solicit siliceous material but generally pays a premium on ron and lime. If a large operation is contemplated, trial shipments are usually sent to smelters, to custom mills, and to physical laboratories or data on proper milling procedure. In large operations a pilot-plant s often built in advance of the mill. A small prospective producer is imited and usually ships trial lots to smelters and to custom mills.

Milling

Milling of Complex Ores.[2] The technology relating to mineral dressng and known as physical metallurgy depends upon the physical prop-

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Modified, in part, after Brammel, H. R., 1948, Marketing and metallurgy of complex ores in California: California State Div. Mines Bull. 144.

erties of minerals and aims at concentrating and separating the valuable mineral constituents from each other as well as from the worthless, or gangue minerals. The process involves sizing and conditioning of ore particles, grinding to effect mechanical separation, and concentration and separation of the valuable minerals. Concentration in mineral dressing may be accomplished by various means including gravity separation, flotation, magnetic separation, or separation by size differential. All steps depend on the physical properties of minerals and thus are classified as mechanical processes. Each ore presents a special problem and the mill man will take advantage of each of the physical properties of the minerals involved.

Sizing of ore particles begins in the stopes where ore is reduced to a size convenient for transport to the mill. Grizzlies are employed underground and again at the crude-ore bins. Crude ores ordinarily begin their journey through the mill at a primary jaw-crusher or cone-crusher which reduce ore to the general size of 3 or 4 inches. Secondary crushers of similar type reduce these particles to about a quarter of an inch. The next step is fine grinding to about 60 mesh or smaller. This is generally accomplished by wet-grinding in a ball or rod mill. Overflow from the ball or rod mill passes to a classifier of cone, screw, or rake type where particles are separated by the process of hydraulic settling. As heavier (larger) particles settle they are dragged along the bottom of the classifier by a turning screw or raking action. These particles are returned for further grinding and the overflow from the classifier which contains the fine particles, passes to the separation and concentration section of the mill.

Bulk concentrates containing a mixture of the valuable metals are sometimes produced, especially if one valuable constituent predominates over all others and a marketable concentrate can be produced. Bulk concentration may be accomplished by gravity separation in pulsating jigs or on vibrating tables, or by bulk flotation whereby the sulfides are activated and gangue minerals depressed. Magnetic constituents are sometimes removed by magnetic separators. Where it is desirable to separate two or more valuable minerals to form individual concentrates, selective flotation is usually most applicable. Gravity differential is usually not sufficient to allow a complete separation by jigging or tabling. A bulk concentrate not amenable to selective flotation may be further concentrated by the Waetz process (see section on smelting). Separate zinc oxide and lead oxide products can be produced; also a sinter containing the copper and precious metals.

The discovery that mineral surfaces could be conditioned in such a way that they would resist wetting and could be floated, lead to the development of the flotation process. Conditioning is accomplished by adding minute quantities of certain organic substances known as collectors to an aqueous suspension of fine mineral particles. The organic molecule attaches itself to the sulfide particle and renders it unwettable. The mineral pulp is then agitated in a flotation cell and air bubbles introduced at the bottom of the cell will collect the conditioned sulfide particles and carry them to the surface. To prevent the bubbles from breaking and losing their burden at the surface, frothers are added to give strength to the bubbles. The froth is floated or raked off continuously at the top of the cell. The gangue minerals are not affected by the conditioners or collectors and will remain wetted and in suspension.

Each mineral has a different magnitude of wettability and by the proper choice of reagents one sulfide can be activated while all others are depressed. A sulfide that is easily floated may be separated from a less floatable sulfide just by adding a minimum of the collecting agent. Various oragnic compounds have different affinities for different sulfides and it is possible to selectively float one sulfide at a time.

Common collectors are amyl xanthate and ethyl xanthate. The most common frothing agents are pine oil and cresylic acid. The relative alkalinity or acidity (pH) is important in selective flotation and other regulating reagents known as modifiers or controllers are added to the pulp to insure the desired pH. Common acids and bases are used for this purpose. Other modifiers and controllers include inorganic salts such as copper sulfate and sodium cyanide, complex organic salts which act as detergents against deleterious coatings on mineral particles, and substances which exhibit collodial properties such as starch.

By controlling the activation of minerals through selection of activating reagents, depressing reagents, and modifiers the mineral constituents may be floated separately. The pulp is conditioned to activate the first mineral to be separated. The first "rougher cell" will float the bulk of the activated mineral and subsequent cells in the series will treat the middling product which did not float in the first cell. The last rougher cell will contain the tailings and the depressed ore minerals to be activated and separated later. Froth from the rougher cells is further cleaned in a series of "cleaner cells." The concentrate from this series goes to a thickener and dryer and then to a concentrate bin ready for shipment. The tailings from the cleaner cells are usually returned to the first rougher cell since they still contain value. The tailings from the series of rougher cells passes through a second reconditioning process where the next mineral to be activated and floated is conditioned with the appropriate collectors and modifiers. The process of "roughing" and "cleaning" is repeated in a second bank of cells. The tailings from the second set of rougher cells may pass through a third cycle if another mineral is worthy of recovery.

Milling of Zinc-Copper Ores. The milling of zinc-copper ores presents one of the most difficult problems in mineral dressing. In these ores, the intimate association of sphalerite and the copper sulfides makes mechanical separation difficult. The fine grinding which is required to separate the minerals, besides being expensive, produces a slime which is difficult to handle. In attempting to liberate all particles, those which were reduced to a small size early in the grinding circuit suffer unnecessary grinding. In order to produce a marketable product which will bring a high return, zinc must be kept low in copper concentrates, and zinc concentrates below a certain grade are penalized at the zinc smelter. To realize a fair return on lead contained, it must be shipped to a lead smelter. Lead contained in copper concentrates is usually paid for at low rates. Therefore it is usually desirable to produce separate concentrates.

In the usual scheme of selective flotation of zinc-copper ores, pyrite and sphalerite are depressed by conditioning of the pulp with cyanide and zinc sulfate; the copper minerals are floated with a xanthate collector in a neutral environment. The copper concentrate goes to "cleaner cells" and the tailings are reconditioned with copper sulfate which forms a coating and renders the sphalerite floatable. Lime is added to the pulp to raise the pH and suppress the pyrite. Sodium aerofloat is a common collector used to float the sphalerite. A special frothing agent is also used. Minor amounts of galena in these ores generally are not important and usually appear in the copper concentrate.

One of the great difficulties in milling zinc-copper ores is the tendency for sphalerite to become coated with copper sulfide. This tendency is strongest in high pyrite ores where oxidation of the pyrite forms sulfurous acid which dissolves copper and redeposits it on sphalerite surfaces. This action pre-activates sphalerite and makes it hard to depress in the copper circuit. Superficial oxidation of ore in the stopes must be avoided. This makes it impraticable at times to use methods such as shrinkage stoping. Ore must be rushed to the mill as soon as possible. This further causes the annoyance of surges in grade since ore cannot be held for blending. Precautions are usually taken to prevent pre-activation of sphalerite in the grinding circut, by keeping the pH high with lime or soda ash.

With modern milling practice about 95 percent of the contained zinc and 85 percent of the contained copper can be recovered in a bulk flotation concentrate. Recovery in separate concentrates is lower. Zinc concentrates will contain a few percent copper and copper concentrates will contain some zinc.

When complex ores are milled, especially those mined primarily for their precious metal content, or in some cases for their tungsten content, a bulk base-metal concentrate may be more feasible, particularly if it is strictly a by-product, as in tungsten milling.

Milling of Lead-Zinc-Silver Ores. The milling of lead-zinc-silver ores presents special problems and oxidized ores must be handled separately. If the oxidized lead ore has been well leached of its zinc content and contains about 20 percent or more lead, it is generally more economical to ship directly to a lead smelter than to mill. If the oxidized ore does not meet shipping requirements it must be segregated in the stopes and handled separately from the sulfide ore. This is true because cerussite (lead carbonate), anglesite (lead sulfate), and galena with oxidized coatings, cannot be activated in the sulfide circuits but must be treated with sodium sulfide previous to flotation. Sodium sulfide forms a thin lead sulfide coating on the carbonate and sulfate minerals making them respond like galena in the flotation circuit. By this means a good recovery can be obtained. The primary sulfide ore is treated in a separate circuit where selective flotation of sphalerite and galena are conducted in a manner similar to the selective flotation of complex zinc-copper ores.

The lead concentrate generally contains most of the minor copper which is present, and a large proportion of the gold and silver, as well as a few percent zinc. Zinc concentrates unavoidably contain some lead, part of the silver, and minor gold, and copper, as well as cadmium. Zinc concentrates in California contain from 0.22 to 0.28 percent cadmium in all districts. This is eventually recovered from flue dust at lead smelters and from fume and dust at zinc smelters.

SMELTING AND REFINING[3]

The purpose of smelting is to reduce chemical compounds such as sulfides to the metallic state or to a mixture of metals and gangue material higher in metal content, thereby eliminating most of the worthless material. Two processes are in use; pyrometallurgy whereby fusion converts the furnace charge into a molten state which allows settling of the metals by gravity, and distillation whereby the metal content is distilled off with or without complete fusion of the charge. Pyrometallurgical methods are used in the smelting of copper and lead. Zinc, because of its low boiling point, is amenable to the distillation process.

Lead Smelting. The pyrometallurgical smelting of lead is conducted in a low, rectangular blast furnace. Air is blown in from the sides near the bottom, and the charge is mechanically fed in from the top which is about 20 feet above the tapping spout. The charge contains about 75 percent sintered concentrates and ore, about 12 percent coke, and the remainder is fluxing material. Sintered ore and concentrates are blended in such a way as to form a charge with the correct proportions of the principal fluxing materials (lime, silica, and iron). This eliminates the need for adding undue amounts of fluxing materials containing no metal values. The coke contained in the charge supplies the fuel and acts as a reducing agent in combination with the air being blown through the charge. In this reducing atmosphere metallic lead forms and flows to the bottom of the charge where it is siphoned or tapped off and sent to the refinery. The fluxing materials form a liquid slag which floats above the molten lead.

Zinc contained in the lead ores and concentrates goes into the slag and into the flue dust. Slags contain from 5 to 12 percent zinc and may be fumed, for their zinc content. The flue dust which contains zinc, copper, cadmium, lead, and minor silver and gold is recovered in a baghouse and subsequently smelted or otherwise treated. Flue dust may be blended with ores and concentrates and returned to the blast furnace. Most of the precious metals are contained in the lead melt and are later recovered at the refinery. Copper contained in the charge forms copper-iron speiss which is skimmed off in a drossing kettle and subsequently treated to recover the copper.

Zinc Smelting and Fuming. The smelting of zinc is more involved than the smelting of copper or lead, and recovery is generally lower. These facts account for the lower return to the miner. The physical chemistry of zinc, and especially its low boiling point (905° C.) restrict smelting procedures and make recovery expensive and involved. Several processes are in use.

The batch retort process which is one of the older methods, employs the use of small (7 inches by 4 to 6 feet) cylindrical retorts of refractory material, which stand vertically in a gas-fired furnace. Condensers are attached to the open ends. The ore and reducing agent is added in batches every 24 hours. Spelter or impure zinc may be tapped several times between successive charges.

Modified, in part, after Bramel, H. R., 1948, Marketing and metallurgy of complex ores in California: California State Div. Mines Bull. 144.

Average market price of lead and zinc in the United States, 1898-1953.

(In cents per pound)

Year	Common lead, New York	Prime Western zinc, East St. Louis	Ratio of price of lead to price of zinc	Price of lead plus price of zinc	Year	Common lead, New York	Prime Western zinc, East St. Louis	Ratio of price of lead to price of zinc	Price of lead plus price of zinc
			Percent					Percent	
1898	3.780	4.570	82.7	8.350	1926	8.417	7.337	114.7	15.754
1899	4.470	5.750	77.7	10.220	1927	6.755	6.242	108.2	12.997
1900	4.370	4.390	99.5	8.760	1928	6.305	6.027	104.6	12.332
					1929	6.833	6.512	104.9	13.345
1901	4.330	4.070	106.4	8.400	1930	5.517	4.556	121.1	10.073
1902	4.069	4.840	84.1	8.909					
1903	4.237	5.191	81.6	9.428	1931	4.243	3.640	116.6	7.883
1904	4.309	4.931	87.4	9.240	1932	3.180	2.876	110.6	6.056
1905	4.707	5.730	82.1	10.437	1933	3.869	4.029	96.0	7.898
					1934	3.860	4.158	92.8	8.018
1906	5.657	6.048	93.5	11.705	1935	4.065	4.328	93.9	8.393
1907	5.325	5.812	91.6	11.137					
1908	4.200	4.578	91.7	8.778	1936	4.710	4.901	96.1	9.611
1909	4.273	5.352	79.8	9.625	1937	6.009	6.519	92.2	12.528
1910	4.446	5.370	82.8	9.816	1938	4.739	4.610	102.8	9.349
					1939	5.053	5.110	98.9	10.163
1911	4.420	5.608	78.8	10.028	1940	5.179	6.335	81.8	11.514
1912	4.471	6.799	65.8	11.270					
1913	4.370	5.504	79.4	9.874	1941	5.793	7.474	77.5	13.267
1914	3.862	5.061	76.3	8.923	1942	6.481	8.250	78.6	14.731
1915	4.673	13.054	35.8	17.727	1943	6.500	8.250	78.8	14.750
					1944	6.500	8.250	78.8	14.750
1916	6.858	12.634	54.3	19.492	1945	6.500	8.250	78.8	14.750
1917	8.787	8.813	99.7	17.600					
1918	7.413	7.890	94.0	15.303	1946	8.109	8.726	92.9	16.835
1919	5.759	6.988	82.4	12.747	1947	14.673	10.500	139.7	25.173
1920	7.957	7.671	103.7	15.628	1948	18.043	13.589	132.8	31.632
					1949	15.364	12.144	126.5	27.508
1921	4.545	4.655	97.6	9.200	1950	13.296	13.866	95.9	27.162
1922	5.734	5.716	100.3	11.450					
1923	7.267	6.607	110.0	13.874	1951	17.500	18.000	97.2	35.500
1924	8.097	6.344	127.6	14.441	1952	16.467	16.215	101.6	32.682
1925	9.020	7.622	118.3	16.642	1953	13.489	10.855	124.3	24.344

Copper smelters in United States at end of 1952.[1]

Plant	Company	Annual capacity in tons of charge
Cartaret, New Jersey	American Metal Company, Ltd.	200,000
El Paso, Texas	American Smelting and Refining Company	300,000
Garfield, Utah	American Smelting and Refining Company	1,608,000
Hayden, Arizona	American Smelting and Refining Company	300,000
Tacoma, Washington	American Smelting and Refining Company	675,000
Anaconda, Montana	Anaconda Copper Mining Company	1,000,000
Miami, Arizona	International Smelting and Refining Company	360,000
Superior, Arizona	Magma Copper Company	250,000
McGill, Nevada	Kennecott Copper Corporation	440,000
Hurley, New Mexico	Kennecott Copper Corporation	400,000
Laurel Hill, New York	Phelps Dodge Corporation	200,000
Douglas, Arizona	Phelps Dodge Corporation	1,250,000
Morenci, Arizona	Phelps Dodge Corporation	900,000
Ajo, Arizona	Phelps Dodge Corporation	300,000
Clarkdale, Arizona	Phelps Dodge Corporation	1,400,000
Copperhill, Tennessee	Tennessee Copper Company	70,000
Hubbell, Michigan	Calumet and Hecla Inc.	100,000
Hancock, Michigan	Quincy Mining Company	12,000

[1] Am. Bur. Metal Statistics, Yearbook 1952, 32d ann. issue, 1953.

Lead-silver smelters in the United States.[1]

Plant	Company	Annual capacity in tons of charge
East Helena, Montana	American Smelting and Refining Company	336,000
El Paso, Texas	American Smelting and Refining Company	300,000
Leadville, Colorado	American Smelting and Refining Company	180,000
Selby, California	American Smelting and Refining Company	192,000
Bradley, Idaho	Bunker Hill smelter	300,000
Tooele, Utah	International Smelting and Refining Company	300,000
Midvale, Utah	United States Smelting, Refining, and Mining Company	250,000

[1] Am. Bur. Metal Statistics, Yearbook 1952, 32d ann. issue, 1953.

Electrolytic zinc plants in the United States at end of 1952.[1]

Plant	Company	Annual capacity in tons of slab zinc
Corpus Christi, Texas	American Smelting and Refining Company	39,000
Monsanto, Illinois	American Zinc Company of Illinois	40,000
Great Falls, Montana	Anaconda Copper Mining Company	165,000
Anaconda, Montana	Anaconda Copper Mining Company	75,000
Silver King, Idaho	Sullivan Mining Company	56,000

[1] Am. Bur. Metal Statistics, Yearbook 1952, 32d ann. issue, 1953.

Zinc smelting plants in the United States using horizontal retorts.[1]

Plant	Company	Daily capacity in tons of spelter
Amarillo, Texas	American Smelting and Refining Company	160
Bartlesville, Oklahoma	National Zinc Company	115
Blackwell, Oklahoma	American Metal Company	235
Donora, Pennsylvania	United States Steel Corporation (American Steel and Wire Division)	150
Dumas, Texas	American Zinc Company of Illinois	110
East St. Louis, Illinois	American Zinc Company of Illinois	70
Forth Smith, Arkansas	Athletic Mining and Smelting Company	78
Henryetta, Oklahoma	Eagle-Pitcher Company	125
Ls Salle, Illinois	Matthiessen and Hegeler Zinc Company	90

[1] Am. Bur. Metal Statistics, Yearbook 1952, 32d ann. issue, 1953.

Secondary lead smelters and refiners in California.[1]

American Smelting and Refining Company (Federated Metals Division), Los Angeles and San Francisco

Berg Metal Corporation, Los Angeles

Eastern Smelting and Refining Company, Los Angeles

Morris B. Kirk and Son, Inc. (National Lead Company), Los Angeles

Secondary zinc distillers in California.[1]

American Smelting and Refining Company (Federated Metals Division), Los Angeles

Pacific Smelting Co., Torrance

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[1] Am. Bur. Metal Statistics, Yearbook 1952, 32d ann. issue, 1953.

PHOTO 4. Tailings dump and mine buildings at the Pine Tree and Josephine mine, Mariposa County, which has yielded substantial amounts of lead. *Photo by Mary R. Hill.*

PHOTO 5. Washington (Jenny Lind) mine, near Hornitos, Mariposa County. This mine, from 1939-42, produced 3131 ounces of gold, 2436 ounces of silver, 1060 pounds of copper, and 111 pounds of lead. *Photo by Mary R. Hill.*

Typical smelter schedule for base metal ores and concentrates

Payments

GOLD: If .03 ounce per dry ton or over, pay for 91% at United States Mint price. Nothing paid for gold if assaying less than .03 troy ounce per dry ton. (.02 ounce limit at some smelters).

SILVER: Pay for 95% at average Handy & Harman quotation.

LEAD: Deduct 1.5 units from wet assay and pay for 90% of remaining lead at average New York quotation less 2.27 cents per pound. Nothing paid for lead if less than 5% by wet assay.

COPPER: Deduct 1.3 units from wet assay and pay for remaining copper at average New York quotation less 6.6 cents per pound. Nothing paid for copper if less than 1.3% by wet assay.

IRON: Paid for at 6.0 cents per unit.

LIME: Paid for at 5.0 cents per unit if 5% or over.

ZINC: Some smelters pay for 75% of zinc at 22% of East St. Louis price if 10% or more is present. They in turn penalize at 15 cents per unit when zinc is paid for. When zinc is not paid for, penalties range from 25 cents to 30 cents per unit, with 6% to 8% allowed free of penalty.

Deductions

BASE CHARGE: $6.00 to $8.50 per dry ton. Add 10 cents per ton unit of lead under 30%, deduct 10 cents per ton per unit of lead over 30%. (Procedures vary somewhat at different smelters.)

INSOLUBLE: Charge for all at rate of 10 cents per unit.

COMBINED ARSENIC, ANTIMONY, and TIN: 1% allowed free of penalty. Excess charged at 50 cents per unit.

ZINC: 6% to 7% allowed free of penalty. Excess charged at rate of 25 cents to 30 cents per unit.

BISMUTH: Charge for all at rate of $10.00 per unit.

SULFUR: 2% allowed free of penalty. Excess charged at rate of 25 cents per unit. Maximum charge $2.50 per net dry ton.

MOISTURE: Moisture will be deducted. (Minimum deduction 1%). Moisture in excess of 10% will be penalized at 10 cents per unit.

Note: Rates are for carload lots. Lots containing 15 tons or less will be assessed an additional $12.50 handling and sampling charge.

Typical smelter schedule for milling ores at a concentrator-smelter.

Payments

GOLD: Pay for 100% of gold at $22.46 per ounce. No payment if assaying less than .02 troy ounces per dry ton.

SILVER: Pay for 70% of silver at Handy and Harman quotation. No payment if assaying less than one ounce per ton.

LEAD and COPPER: Pay for 70% of the sulfide lead and copper combined at the average New York quotation for lead, less 2.80 cents per pound. No payment if less than 3% total lead and copper combined.

ZINC: Pay for 60% of the sulfide zinc content at 40% of the East St. Louis price. No payment for zinc if assaying less than 3%. For each % zinc in excess of 15% add 1% to the percentage zinc paid for; but in no event shall percentage paid for exceed 70%. Also for each % zinc in excess of 15% add to payment .05 cents per pound, but in no event shall additional payment exceed .50 cents per pound.

Charges

TREATMENT CHARGE: $4.25 per ton.

NOTE: Quotations are for carload lots. A charge of $10.00 for sampling and assaying will be assessed for lots less than 10 tons. Purchase terms for milling ore depend on results of milling tests on a representative sample.

Typical schedule at electrolytic zinc plant.

Payments

ZINC: Pay for 80% at East St. Louis price for Prime Western zinc.

LEAD: Pay for 80% of excess over 3% at New York price less 2.0 cents per pound.

SILVER: Pay for 80% if 1.0 ounce or over, at average Handy and Harman price.

GOLD: Pay for 100% if 0.10 ounces or over, at $27.02 per ounce.

Charges

BASE CHARGE: $30.00 per dry ton, f.o.b. zinc plant, based on 10½ cent zinc, labor $11.40 per 8-hour day and a lead content of 3.0%.

ZINC PRICE: Add or deduct $1.00 per ton for each 1.0 cent increase or decrease above or below 10½ cents per ton.

LEAD DEFICIENCY: Add 50 cents per ton for each 1.0% lead under 3.0%.

INSOLUBLE and IRON: Add 25 cents per ton for each 1.0% insoluble plus iron.

LABOR: Add or deduct 1.0 cent per ton for each 1.0 cent increase or decrease above or below $11.40 per shift total labor cost.

NOTE: Representative of schedules which have been quoted for small shipments of concentrates which have been found acceptable from the standpoint of impurities, and which have no unusual composition.

Typical smelter schedule for siliceous gold-silver ores.

Payments

GOLD: If .03 troy ounce per dry ton or over and less than 5.0 ounces, pay for 91.14%; if 5.0 ounces or over but less than 10.0 ounces, pay for 92.57%; if 10.0 ounces or over but less than 15.0 ounces, pay for 93.28%; and if 15.0 ounces or over pay for 94.0% at the price paid by the United States Mint ($35). Nothing paid for gold if assaying less than .03 troy ounces per dry ton.

SILVER: Pay for 95% at average Handy and Harman quotation.

Deductions

BASE CHARGE: $8.50 per dry ton of 2000 pounds; provided sum of payments for gold and silver does not exceed $20.00 per ton. Add to base charge 10 percent of the excess over $20.00 to a maximum charge of $15.00 per dry ton.

INSOLUBLE: All units allowed free of penalty.

COMBINED ARSENIC ANTIMONY & TIN: 1% free. Excess charged at 50 cents per unit.

ZINC: 7% allowed free of penalties. Excess charged at 30 cents per unit.

BISMUTH: Charge for all units at $10.00 per unit.

MOISTURE: Minimum deduction of 1%; actual moisture content will be deducted from weight. Moisture in excess of 10% will be charged 10 cents per unit.

HANDLING CHARGES: Quotations are for shipments received in dump bottom equipment. Unloading charge of 75 cents per dry ton assessed for ore arriving in box cars or hopper bottom gandolas. Ore received by truck will be assessed actual cost of unloading.

(NOTE: Quotations are for carload lots. Shipments of 15 tons or less will be assessed a handling and sampling charge of $12.50.)

The New Jersey Zinc Company has developed a continuous vertical retort process (Bunce and Handwerk, 1936) which is much more efficient and has larger capacity.

In the electrothermic process (Weaton, 1936) used by St. Joseph Lead Company, sintered ore and coke are mixed in equal proportions to form an electrically conductive charge. Current passing through the charge supplies sufficient heat for distillation. Fumes are pumped by vacuum and forced to bubble through a bath of molten zinc. With careful temperature control of the zinc bath, fractional distillation produces a high quality zinc 99.97 percent pure.

The Waelz process (Harris, 1936) is principally one of concentration since a finished product is not produced. The process involves calcining in a rotary kiln. The fume produced is an impure zinc oxide containing lead, cadmium, and other impurities.

The electrolytic process (Laist and Caples, 1945) is divided into three steps. First, ore and concentrates are roasted and the zinc sulfide is converted to zinc oxide and zinc sulfate. The calcines are then leached with sulfuric acid producing a zinc sulfate solution which after purification goes to electrolytic cells where pure zinc is deposited electrolytically.

Copper Smelting. Copper ores and concentrates are usually roasted prior to smelting. This eliminates most of the sulfur and forms a product more uniform in size and composition both of which aid in better control of the smelting process. Fluxing material is added to the sinter-cake and the loose mixture is charged in a refractory lined vessel about 130 feet long, 30 feet wide, and 3 feet deep. The hearth is covered by a low refractory-lined arch to confine the heat. Where possible, much of the fluxing material is in the form of low grade copper, gold, or silver ore. Gas, oil, or coal dust are burned above the charge. During fusion the fluxing materials combine with the gangue minerals to form a siliceous slag which will rise to the top while metallic copper, some of the iron and sulfur will form a heavy matte in the bottom of the vessel. If the charge is proper and contains the right proportions of fluxing material (lime and silica) the slag should be free of copper and form a fluid lime-iron silica melt which can be tapped off near the top of the vessel. Copper matte containing the precious metals is tapped near the bottom. This is known as a reverberatory furnace.

The liquid matte is delivered to the converter which is a refractory-lined vessel equipped with air inlets called tuyeres. Air is blown through the molten matte to remove the excess sulfur. This produces a rich copper-sulfur mixture called white metal. A second stage of blowing further removes sulfur and produces impure or blister copper which is sent to the refinery.

Zinc contained in the copper concentrates causes much trouble in the charge of the reverberatory furnaces and for this reason is heavily penalized in copper ore or concentrates.

Smelting of Siliceous Gold-Silver Ores. Most of the gold and silver produced from siliceous ores is recovered at the mine by amalgamation or cyanidation. When the precious metals are locked in base-metal sulfides or the ore is not generally amenable to direct recovery methods, concentrates are shipped to smelters. Such concentrates usually do not contain more than a few percent of the base metals. They are known as dry ores and are used at the lead smelter to flux lead ores and concentrates. For this reason all insolubles contained are usually allowed free of penalties. It is very seldom that lead smelters are obliged to solicit siliceous ores, however, and for this reason premiums are almost never paid.

The precious metals have a natural affinity for lead and are recovered from the lead during refining. Recovery is high.

Refining of Lead. Molten lead from the blast furnace contains minor impurities of arsenic, bismuth, antimony, copper and tin, and most of the silver and gold. The first step in refining is the transfer of the metal to large drossing kettles where it is agitated with air to oxidize part of the impurities. Copper-lead arsenides and antimonides float to the surface and are skimmed off. This dross is further treated to recover the copper and lead. The next step is to ''soften'' the lead by removing the antimony and tin as oxides which are skimmed off in the ''softening kettle.'' After softening, the lead goes to the de-silvering kettles where metallic zinc is added. Gold and silver combine with the zinc to form a lightweight dross which floats on the lead. This material is skimmed off and sent to the silver refinery. The lead is then treated to remove the bismuth, and finally poured into lead pigs.

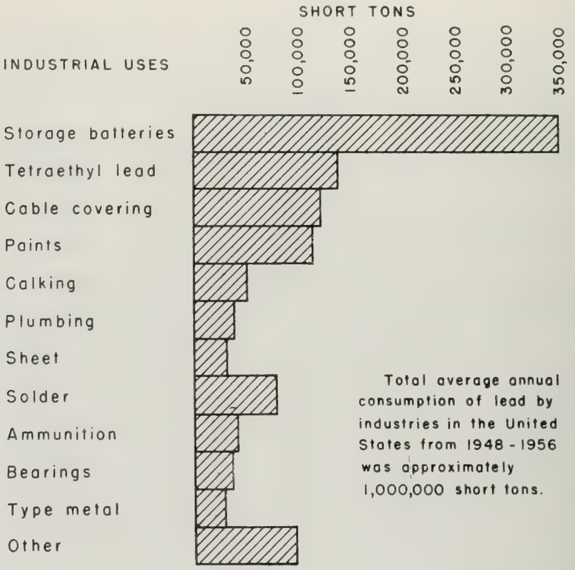
The zinc-lead dross which contains the gold and silver is distilled to drive off the zinc. The remaining lead contains all of the gold-silver and is treated in cupelling furnaces to remove the lead as an oxide. The remaining gold-silver bullion is cast into anodes which are then placed in electrolytic cells to separate the gold and silver. Silver crystals form on the cathodes, are collected, melted down, and cast into bars. The gold accumulates as a black sludge in the bottom of the electrolytic cell. This sludge is treated with sulfuric acid and refined gold is produced by the Wohlwill process.

Refining Zinc. The zinc produced by the electrolytic process needs no further refining and zinc recovered as zinc oxide fume is marketable as such. Zinc produced by distillation methods contains some lead and cadmium impurities. If a high purity zinc is desired it may be obtained either by the electrolytic process or by the reflux fractional distillation process. (Ingalls, 1945). Molten spelter from the retort process is revaporized and forced up through a chamber where it comes in contact with falling droplets of molten lead. Lead is thus removed and the rising vapor becomes richer in zinc and cadmium. A second chamber with falling zinc droplets removes the zinc from the fume and cadmium passes up and out as a vapor and dust. By this method zinc 99.99 percent pure can be made.

Utilization

Lead and zinc are two of the most common base metals upon which industry relies for a wide variety of fabricated commodities. Their production and consumption are exceeded only by steel, copper, and aluminum.

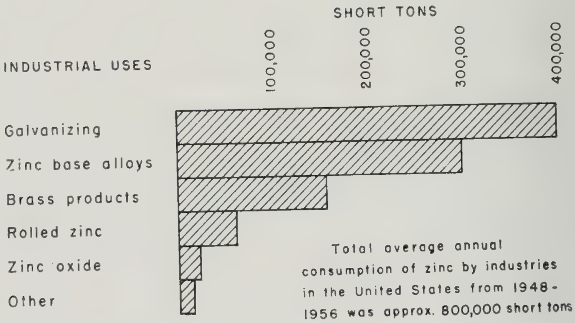
Lead is firmly entrenched in most of its uses but is not entirely free of competition from substitutes. The physical and chemical properties



Total average annual consumption of lead by industries in the United States from 1948 - 1956 was approximately 1,000,000 short tons.

GRAPH SHOWING AVERAGE ANNUAL
CONSUMPTION OF LEAD
BY INDUSTRIES IN THE UNITED STATES
1948 - 1956

FIGURE 1.



Total average annual consumption of zinc by industries in the United States from 1948 - 1956 was approx. 800,000 short tons

GRAPH SHOWING AVERAGE ANNUAL
CONSUMPTION OF ZINC
BY INDUSTRIES IN THE UNITED STATES
1948 - 1956

FIGURE 2.

which make lead of great value in industry are its softness, or easy workability, its weight, high resistance to corrosion, high boiling point and low melting point, alloyability with other metals, and its shielding effect to radiation. The relative cheapness of lead in comparison to other base metals is, of course, a prime factor.

The physical and chemical properties that give value to zinc in modern industry are primarily its resistance to corrosion and its alloyability with other metals. Here again the relative cheapness of zinc accounts for its wide use and the threat of substitutes is much more formidable than for lead.

The relative magnitude of uses of lead and zinc are clearly demonstrated by the accompanying tables and have not varied greatly over the past 20 years. The automotive industry consumes over 40 percent of the total lead in the form of storage batteries and tetraethyl lead. Most of the lead used in storage batteries is ultimately recovered as scrap. The major losses are in lead consumed in tetraethyl lead and in pigments.

Aluminum and plastics are now in competition with lead in certain types of cable sheathing; however, the greater expense of aluminum prevents any serious competition at present. Nickel-cadmium storage batteries though of much greater initial cost, have greater life and efficiency. They are not generally available to the public at present but may in the future be a serious threat to lead in its primary field of use. Titanium and other pigments are being used more and more in place of lead pigments, and the use of lead foil has declined in favor of plastics and aluminum. The only new use which may be of significance to the future of lead is its use as a shield in atomic radiation devices.

The value of zinc in the galvanizing and zinc alloy industries has resulted from the relative abundance and cheapness of this common base metal. Zinc galvanized steel has filled an immediate need for cheap, corrosion resistant material. The main disadvantage is the weight and, for this reason, aluminum sheeting, though of higher cost, has become a serious competitor. As the cost of aluminum has been reduced through technological advances in smelting, aluminum has also become competitive in the die-casting industry. The reluctance of manufacturers to switch to substitutes has had a moderating effect on the relative decline of the zinc industry. The price of zinc must remain considerably below aluminum in order to prevent a great loss to this formidable competitor.

The accompanying price chart shows the price fluctuation from which the relative demand can be inferred. The relative stability of lead over zinc is probably due in large part to its great recoverability; sudden demand is more readily supplied from available scrap.

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LIST OF MINES

The following table lists lead and zinc mines in alphabetical order by county. The number in the first column refers to the location on the accompanying map, Economic Mineral Map of California number 7, in the pocket of this volume.

The notation as to ''class'' and ''type'' refers to the total production and chief mineral products, as defined on the map.

References given in the *Remarks* column refer to the bibliography accompanying this report. Only the last name of the author is given. The first number following the author's name is the abbreviated date of publication as cited in the bibliography; the second number, that following the colon, is the page reference.

ALAMEDA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Berkeley Hills						Lumps of galena weighing as much as 100 lbs. are reported to have been found in Codornices Canyon near Euclid Avenue in Berkeley. (Lawson 14: 23)

ALPINE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
1	Advance (North Advance)	L. G. Ballom & Drake, 221½ West Third Street, Reno, Nevada (1944)	31 32	10N	21E	MD	Class D, Type 1. Located on Monitor Creek, 6 miles SE of Markleville. Produced between 1920-44, small shipments of argentiferous galena with free gold and minor amounts of copper. Estimated production over $50,000. (Eric 48:212; Irelan 88:38; Logan 21:401; 23:358; see also reports on the Morning Star mine.)
	Alhambra Mining Corp.	Alhambra Mining Corp., J. W. Hopkins, manager Garderville, Nevada	appr.	10N	18E	MD	Class D, Type 2. Fifteen unpatented claims 13 miles west of Woodfords on Red Lake Peak at an elevation of 9500 feet. Country rock is quartz-mica schist intruded by granite. Quartz stringers in iron-stained zones carry pyrite, pyrrhotite, galena, sphalerite, chalcopyrite, and gold and silver. No recorded production. (Logan 31: 488)
2	Black Jack		28	11N	21E	MD	Class D, Type 1. Prospect showing high-grade galena on surface and in clay seams. No vein was found. No recorded production. (Logan 21:404)
	Curtz						See: Morning Star
	Georgian						See: Morning Star
	Joe Larson	A. L. Stewart and Weseley Crothers, Markeleeville (1928)	appr.	10N	21E	MD	Class D, Type 1. Prospect in Lexington Canyon, near the old town of Loope. Trenching on the surface in 1928. A small shipment of ore was made; smelter recovery 0.20 ounces gold, 124 ounces silver, and 30% lead per ton.
	Lost Cabin	C. Mailske, Jackson (1939)	appr.	10N	18E	MD	Class D. Gold mine on the north slope of Round Top Mountain; developed by an 80-foot shaft, 250 feet of drifts and 175 feet of tunnels. Total production estimated at $4000 from gold-silver-lead ore with minor copper between 1932-1938. (Eric 48:213)

ALPINE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
3	Morning Star	Morning Star Min. Co., Byington Bldg., Reno, Nevada (1953)	29	10N	21E	MD	Class C (?), Type 2. Consolidated group of 17 claims including Curtz mine, Morning Star mine and others of the Mogul mining district. Located about 7 miles SE of Markleeville, just north of Colorado Hill. Faulted and brecciated andesite, hydrothermally altered and highly silicified and mineralized with irregular bodies of complex ore. The main production has been in copper from enargite, chalcopyrite, famatinite and tetrahedrite. Also present are argentite, polybasite, pyrargyrite, stephanite, stromeyerite and argentiferous galena and sphalerite. Gold occurs free, in the sulfides, and in tellurides. High-grade ore is reported to have been mined and shipped to Swansea, Wales, during the late 1800's. Large low-grade bodies are reported to exist. No record of production. Idle. Developed by several long adits and a vertical shaft. (Aubury 05:199; Eakle 19:14-22; Eric 48:213; Irelan 88:38; Logan 21:403; 23:362; 31a:489; Rand 31:483-484; Raymond 72:53; 73:95; 73a:15; Root 68:201-03)
	North Advance						See: Advance.
	Zaca	H. B. Chessher, Reno, Nevada (1952)	31	10N	21E	MD	Class D, gold mine. Includes Lincoln, Orion, Alpine and other claims of the Monitor district just south of the Morning Star group, on Colorado Hill. Gold and epithermal hubnerite with minor sulphides in brecciated and silicified andesite and dacite. Total production unknown. Idle. (Eakle 19:25; Gianella 38; Irelan 88:38; Raymond 74:54, 57-58; Tucker 41:565; Zimmerman 42:307)
	Unknown	H. D. Maitlen, Silver Lake (1939)					Class D, Type 1. Small shipment to Midvale, Utah, in 1939. Assay 20% lead, 5 oz. silver, also gold and copper.

AMADOR COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Acme & Robinson						See: Fort Ann. (Carlson and Clark 54:245)
	Ajax	Lucille Harris, Pine Grove (1935)	appr.	7N	13E	MD	Class D. Small production of gold-silver ore with some lead recovered.
4	Allen (Hayward)	Allen Estates, Sutter Creek	22(?)	6N	10E	MD	Class D, Type 2. About 1 mile NE of Newton. Sill-like body of schistose, sericitized felsite mineralized with pyrite, chalcopyrite sphalerite, and gold. No recorded production. Developed on 4 levels from a 70-degree incline. (Carlson and Clark 54:236; Eric 48:59, 214; Tucker 16:12)
	Amador Star (Hamberger, Rhetta, West American Cons. Gold Mines)	H. Kaiser, 720 West Poplar Ave., Stockton (1940)	23	8N	10E	MD	Class D. Gold mine located 3 miles N of Plymouth. Produced over $20,000 in gold and silver 1932-35; also minor copper and lead recovered in concentrates shipped to smelter. (Carlson and Clark 53:167-168, 239; Eric 48:214; Logan 27:186; 35:61-62)
	Belden	Belden Amador Mines Inc., Box 28, Fort Wayne, Indiana (1951)	NW¼ 26	7N	13E	MD	Class D. Gold mine located 1 mile SE of Buckhorn Lodge near Pine Grove in the East Belt district. Operated 1936-49 with a total production over $150,000 in gold and silver; also minor copper and lead recovered in concentrates shipped to smelter. Underground workings total about 4000 feet. Gold occurs native and in auriferous sulfides in quartz stringers in granodiorite. Three en echelon ore shoots dip steeply east as do the veins. The ore minerals are gold, auriferous pyrite, pyrrhotite, galena, and sphalerite. Developed by a 400-foot shaft with levels at 160,250,300, and 350 and several thousand feet of drifts. Production at time the mine was closed due to litigation was 40 tons per day (capacity) of $56 ore; 25 men were employed. (Carlson and Clark 54:170-172; Eric 48:214)

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Big Pine	R. Shaffner, Jamestown (1942). Operator: W.C. Smith, Pine Grove	32	7N	13E	MD	Class D. Small gold-silver production; minor lead and copper also recovered in 1941-42. Development at that time was 358 feet of drifts. (Eric 48:214)
	Black Metal	L. A. Dunlavy, Jackson (1939)	32	7N	12E	MD	Class D. East Belt gold mine which produced between 1909-39, an estimated $20,000 in gold and silver. Some lead was recovered in concentrates.
	Black Prince (Coeur Leonis)	P. M. Wedell and W. R. Schwickerth, Pine Grove (1953)	SE$\frac{1}{4}$ 27	7N	13E	MD	Class D. Gold mine in the East Belt district. Three veins 3 feet wide in granodiorite, mineralized with auriferous sulphides chalcopyrite, pyrite, and galena. Developed by 5 adits; the longest is 700 feet. This mine formerly known as Coeur Leonis. Estimated production 1928-36 over $15,000. Minor lead and copper were recovered in concentrates. (Carlson and Clark 54:172, 240; Eric 48:214)
	Black Wonder	George B. Taves and Florence J. Taves, Pine Grove (1953)	SE$\frac{1}{4}$ 5	6N	12E	MD	Class D. Gold mine located 2 miles SW of Pine Grove just east of Highway 88. Free gold associated with pyrite, chalcopyrite, and galena occurs in a 3- to 4-foot vein of quartz in greenstone. A 9-inch vein of galena is reported on the 45-foot level, 30 feet NW of the 120-foot inclined shaft. A shipment of high-grade is reported in 1933. (Carlson and Clark 54:172, 240)
	Central Eureka	Central Eureka Mining Co., 2210 Russ Bldg., San Francisco (1953)	SW$\frac{1}{4}$ 8	6N	11E	MD	Class C. Gold mine located at the town of Sutter Creek. Operated as the Summit mine 1855-75, and as Eureka and Central Eureka 1895-1953 intermittently. Total production approximately $36,000,000 in gold and silver. The ore is massive quartz, ribbon-quartz in slate, quartz-ankerite-albite rock, and mineralized greenstone or "gray ore". Gold occurs free and in the sulphides pyrite, arsenopyrite, chalcopyrite, sphalerite, and galena. The small base-metal production has been from concen-

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Central Eureka (continued)						trates shipped to the smelters. (For bibliography, see Carlson and Clark 54: 173-177, 241, 242)
	Coeur Leonis						See: Black Prince.
	Contini (Mikado)	Bert Contini, Jackson (1953)	W½ 9	6N	12E	MD	Class D. Gold mine. Two unpatented claims operated in 1889-90, 1935-39, and in 1950. Gold occurs free, with pyrite, chalcopyrite, and galena in quartz veins 6 to 12 feet wide cutting blocky greenstone in contact with granite dikes. Developed by a 250-foot tunnel, 20-foot tunnel, and 200 feet of cross cuts. Production reported as $6,000 from 1935-39. (Carlson and Clark 54:177, 178, 242)
5	Copper Hill	W. F. Detert Estate, 1705 Mills Tower, San Francisco (1951)	34 NE¼ 3	8N 7N	9E 9E	MD MD	Class C, Type 2. Located in the Foothill Copper Belt in the extreme NW corner of the Jackson quadrangle NW of Plymouth. The ore consists of an intimate mixture of fine-grained pyrite, chalcopyrite, and sphalerite with small amounts of gold and silver, in short lenses within gossan-capped veins which strike north and dip moderately east. The wall rock is silicified amphibolite schist. This mine, which was a large copper producer in the past, is developed by over 1200 feet of shafts and over 1800 feet of drifts. During World War II 2864 feet of diamond drilling by the U. S. Bureau of Mines disclosed the presence of three separate lenses of ore in an undeveloped block. High zinc assays as well as commercial amounts of copper have encouraged further work by the U. S. Bureau of Mines and a Defense Minerals Exploration program was under way during the winter of 1952. (See Wiebelt 51) (Aubury 05: 186-87; 08: 226-27; Carlson and Clark 54: 159, 236; Eric 48: 214; Logan 27: 148; Raymond 74: 87; Tucker 16: 12, 13; Wiebelt 51: 5, 6, figs. 4, 5, 6)

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER • NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Defender	West Point Cons. Mines., E. H. Outerbridge, 250 Park Ave., New York City (1953)	SE$\frac{1}{4}$ SW$\frac{1}{4}$ 29	7N	13E	MD	Class D. East Belt gold mine located $\frac{1}{2}$ mile SE of Pioneer Station. Free gold and pyrite occur with minor galena, sphalerite, and chalcopyrite in quartz veins in granite. The mine is developed by a 480-foot shaft (now caved). Production to 1938 reported to be over $20,000. Idle. (Carlson and Clark 54:178, 243; Hamilton 22: 24; Logan 24: 75; Tucker 14:27)
	Delta	Amador Metals Reduction Co., Martell (1943)					Treated tailings from a group of old mines around Ione between 1935-45. Production over $750,000 in gold and silver; some lead and copper also recovered. (Eric 48: 214)
	Elkhorn	Mary and Sadie R. Grillo, Volcano (1953)	SW$\frac{1}{4}$ SE$\frac{1}{4}$ 29	7N	13E	MD	Class D. Gold mine located $\frac{1}{2}$ mile SE of Pioneer Station, in the East Belt district. A 2$\frac{1}{2}$-foot quartz vein in granite; ore minerals are native gold, pyrite, with minor chalcopyrite, sphalerite, and galena. Present operators are V. F. Pierce, W. H. Riddle, F. C. Hamburg (1953). Old workings have caved and present operators are sinking a new shaft. Production about $15,000 in gold and silver with some copper and lead recovered, between 1936-42. (Carlson and Clark 54:178, 179, 244)
	Fort Ann (Acme & Robinson)	Kentland Nimmo, Volcano (1942) William L. Metcalf, Box 52, Volcano (1953)	2	7N	12E	MD	Class D. Gold mine located 3$\frac{1}{2}$ miles N of Volcano in the East Belt district. Developed by over 1000 feet of underground workings. Produced some lead and copper from concentrates shipped between 1934-50. (Eric 48:215; Carlson and Clark 54:179, 245; Crawford 96:66; Logan 27:186; Tucker 16:14)
	Fuller	George F. Fuller, Jackson (1938)	appr. 33	6N	11E	MD	Class D. Gold mine located 2 miles S of Jackson in Murphy's Gulch. Developed by over 6000 feet of underground workings. Produced over $400,000 in gold and silver; some lead and copper in concentrates.
	Garibaldi Ranch	Mrs. Teresa Garibaldi, Drytown (1945)	33	7N	10E	MD	Class D. Gold mine. Small gold production 1922-45. Small amounts of lead and copper recovered in concentrates.

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
6	Grayhouse (Thayer)	East Bay M. U. D., Oakland	23	5N	10E	MD	Class D. Type 2. Northern extension of the Penn mine; disseminated sulphides in sheared meta-volcanic intruded by quartz porphyry. Ore minerals are pyrite, chalcopyrite, sphalerite and some galena in a siliceous gangue. No recorded production. (Aubury 05:186; 08:225; Carlson and Clark 54:237; Eric 48: 85-91; Heyl 44a; Tucker 16:14)
	Hageman	Frank E. Cotie and Vernie Hoffschneider, Leased to: E. V. Grant and E. C. Anderson (1953)	NE¼ 33	7N	13E	MD	Class D. Gold mine. Quartz veins up to 3 feet in width mineralized with free gold, pyrite and minor galena in pockets. This mine, which is located 500 feet east of West Point Power House, is developed by 2 adits 150 and 200 feet long; also a 50-foot inclined shaft. Total production reported over $20,000 in gold-silver. A recorded production of over $7000 between 1933-51. (Carlson and Clark 54: 181, 247; Logan 23:7; 27:190)
	Hamburger						See: Amador Star.
	Harding						See: Madrona.
	Hayward						See: Allen
7	Ione Copper (Irish Hill)	Crocker First National Bank, San Francisco	11	6N	9E	MD	Class D. Type 2. Disseminated sulfides in greenstone just east of slate belt. Produced some copper-zinc-gold silver ore with some stibnite. Operated by Ione Coal and Iron Co., Ione, California in 1915. (Aubury 08: 227; Carlson and Clark 54: 236; Eric 48:215; Lang 07:909, 964, 966; Logan 27:149; Tucker 16: 13; Weed 14: 477)
	Irish Hill						See Ione Copper.
	Kennedy	Kennedy Mining and Milling Co., San Francisco (1942)	16, 17, 20	6N	11E	MD	Class D. Mother Lode gold mine with a large gold production 1888-1942. Produced also about 5000 lbs. of lead from concentrates shipped to smelter. Kennedy tailings

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Kennedy (continued)	Mark Eudey, Martell (1954)	21, 22, 27, 28	6N	11E	MD	treated for gold by Frank J. Fuller, Jackson 1948-50. (Carlson and Clark 54:182-85,249; Eric 48:215; Logan 35:91,92-95)
	Madrona (Harding, Pioneer)	Gwalia Gold Mining Co. Matson Bldg., San Francisco (1941)	20, 21, 22	7N	13E	MD	Class D. East Belt gold mine located 3 miles SE of Volcano, $\frac{1}{2}$ mile S of Pioneer. Between 1895-1941, produced about 46,000 lbs. of lead and 24,000 lbs. of copper from concentrates. Total production from gold-silver over $150,000. (Logan 35:106)
8	Newton Copper	Dufrene Estate, J.H. Lester, Ione	28	6N	10E	MD	Class D. Type 2. Located 6 miles west of Jackson near Sunnybrook Station. Massive and disseminated sulfides in steeply dipping lenses along shear zone in meta-volcanic (greenstone). Ore minerals are pyrite, chalcopyrite, sphalerite, and galena with gold and silver. Produced 1886-1947 over 1,000,000 lbs. of copper with some lead and zinc. Drilled by the U.S. Bur. Mines during World War II (see Wiebelt 51). (Aubury 05:183-85; 08:222-224; Browne 67:143,149,166-167; Carlson and Clark 54: 164,237; Eric 48:216; Irelan 88:106-08; Logan 27:148; Raymond 74:47,87; Tucker 16:13; Wiebelt 51:3-4, figs. 4,5)
	Old Consumnes Copper						See Copper Hill.
	Pine Grove	Wendell M. Miller et al.c/o E.A. DeRuchia, Reno, Nevada (1953)	SW$\frac{1}{4}$ 23	7N	13E	MD	Class D. East Belt gold mine located 1 mile SE of Buckhorn Lodge, Pine Grove. Free gold associated with pyrite, chalcopyrite, and galena in quartz vein 1 to 5 feet wide in granodiorite. Was developed by a 90-foot shaft with 2 levels. (Carlson and Clark 54:189,190, 256)
	Pine Grove Unit	W.F. Peterson, Pine Grove (1953)	SE$\frac{1}{4}$ 32	7N	12E	MD	Class D. East Belt gold mine located $\frac{1}{4}$ mile SW of Pine Grove adjoining Peterson mine. The ore consists of free gold with small amounts of bornite and sphalerite in a

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Pine Grove Unit (cont'd)						quartz vein 3 feet wide in Calaveras slate. Developed by a 187-foot inclined shaft. No recorded production. (Carlson and Clark 54:190,256)
	Pioneer	J. Resut, P.O. Box 245, Amador City (1949) Glen and Everett Fancher, Jackson (1954)	2, 14,35	7N	10E	MD	Class D. Mother Lode gold mine located near Plymouth. Two veins in Mariposa slate. Developed on 5 levels from a 550-foot inclined shaft. Produced over $40,000 in gold-silver between 1895-1949; also minor lead and copper recovered from concentrates smelted. (Carlson and Clark 54:256; Crawford 94:78,79; 96:75; Irelan 88:42; 90:111,112; Logan 27:195; 35:106; Storms 00:83,84; Tucker 16:41)
	Rainbow	Claude Hanley 1727 Hiawatha Ave., Stockton (1953)	NE¼ 32	7N	12E	MD	Class D. Gold mine in the East Belt, 1½ miles NW of Pine Grove. An 8 to 14-foot quartz vein in Calaveras slate, mineralized with free gold, pyrite, and galena. Developed by a 200-foot inclined shaft. Last operated by W.W. Evans, Glendale. Reported production of $314,000 from 1935-41. (Carlson and Clark 54:192,257)
	Rhetta						See: Amador Star.
	Rising Star	D. Loomis, Pine Grove (1935)	11	7N	10E	MD	Class D. Gold mine on the Mother Lode. Small production in 1935; lead recovered as a by-product in concentrates shipped to smelter.
	Thayer						See: Grayhouse
	West American Cons. Gold Mines						See: Amador Star
	Unknown	California Gold Exploration Co.					Class D. Small gold production in 1935; lead and copper recovered in concentrates shipped.
	Unknown	V.R. Fitzsimmons Jackson (1940)					Class D. Produced 1940-41 over 16,000 lbs. of lead as a by-product from gold concentrates.

AMADOR COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Unknown	O.M. Hayes, Jackson (1942)					Class D. Produced some copper and lead as by-product from gold mining.
	Unknown	Robert C. Hoff, Sutter Creek (1946)					Class D. Small shipment of gold ore to Selby in 1946 contained about 2% lead in addition to gold, silver, and copper.

BUTTE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
9	Big Bend (Evening Star, Pinkston)	E.F. Allington, Rt. 1, Oroville Lease to: Hoefling Bros. 1820 - D Street Sacramento (1942)	SE$\frac{1}{4}$ 8	21N	5E	MD	Class B, Type 2. Two claims. Ore consists of banded sphalerite, chalcopyrite, pyrite, chalcocite, covellite, tetrahedrite galena, bornite, gold, and silver replacement bodies in chlorite-sericite schist. Production 1942-45 was 30,000 tons of ore containing 12% zinc, 2% copper, and 0.2% lead. The mine is developed by 134-foot shaft, 360-foot shaft, and 472 feet of drifts; 30 men were employed. Idle. (Averill 43b:312,313; Eric 48:31-42, 217; Logan 31:367,372,378; O'Brien 49:421)
	Bonanza King Prospect	Fred W. Thunen and R. E. Brereton, Oroville (1941)	16	25N	5E	MD	Class D. Gold mine 6 miles east of Chaparral at an elevation of 6,000 feet. A small shipment of gold ore in 1927 contained 8% lead, 3.4% copper, 6.4% zinc, 2.1% antimony, 0.1% arsenic, 2.7% iron and 61.6% insoluble in addition to high gold-silver values. The mine was developed by a 24-foot shaft, 200-foot tunnel and other workings. Active 1921-31. Former operators, John Wells, Yankee Hill, and Lloyd Root, San Francisco (1928) (Logan 31: 367,409).
	Evening Star						See: Big Bend
	Las Plumas						See: Surcease
	Laughing Water	O.L. Tibbals, Star Route, Oroville (1935)					Class D. Shipped gold-silver ore to smelter in 1935; small amounts of lead and copper recovered (Eric 48:217)
	Pinkston						See: Big Bend
	Surcease	Surcease Mining Co. (Hoefling Bros.) Box 786, Sacramento	4,5,6 1,3,12	21N 21N	5E 4E	MD MD	Class D. Gold mine. Comprises 94 acres patented, also claims held by location. Quartz veins in amphibolite schist near granite contact. Ore is auriferous pyrite, chalcopyrite, marcasite, galena, limonite, covellite, bornite, pyrrhotite, native antimony, and bournonite.

BUTTE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Surcease (continued)						Large gold-silver production 1924-43. Base metal recovered about 30,000 lbs. from sulfides saved in the gold concentrates. Developed by inclined shaft. (Logan 31: 381-82; Eric 48:217)

CALAVERAS COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	A. V. G. (Golden Scherer)	A. P. Scotts, Box 35, Mokelumne Hill (1937)	35	6N	13E	MD	Class D. Gold mine in the East Belt 1½ miles south of Railroad Flat. A 12- to 18-inch quartz vein in schist developed by a 45-degree incline 200 feet deep with 3 short drifts. Small production of high-grade gold ore which contained about 0.5% lead recovered in concentrates. (Logan 36a: 261-262)
	Anglo-Saxon						See: Ibex.
	Apex						See: Ford.
	Big Seven	P. Y. Lewis, Copperopolis	appr. 31	2N	13E	MD	Class D. Gold mine located about 3 miles east of Copperopolis. Mineralized zone 300 feet wide consisting of altered calcite, quartz, barite, in sericite schist. Most of the gold is contained in the sulfides, pyrite, galena, and sphalerite. (Logan 36a:243)
	Black Cat						See: Bright Star.
	Blackstone	Fred Sumner, West Point (1952)	8	6N	13E	MD	Class D. Gold mine located between the Middle and North Fork of the Mokelumne River. Produced 10,000 lbs. of lead as a by-product from gold concentrates between 1933-51. Large recorded gold production. Mine equipped with a 40-ton ball mill and 50-ton Flomill. Active.
	Black Wonder	Black Wonder Gold Mining Co., West Point (1942)	22, 27	6N	14E	MD	Class D. Gold mine in the East Belt, 8 miles SE of West Point. Two well-defined fissure veins 18 inches to 2 feet wide in Calaveras schist and slate. Base ore shipped to Selby contained 42% iron sulfides, 9% lead sulfide, and 1 to 2% zinc sulfide, in addition to gold-silver. Over 20,000 lbs. of lead was recovered between 1919-42 in sulfide concentrates. Developed by 250-foot shaft. (Eric 48:218; Logan 36a: 298)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Blizzard	Jack Bardsley, West Point Lease to: Blizzard Mining Co., A. Berwick, Pres. S. F. (1933)	appr. 22	6N	13E	MD	Class D. Gold mine in the East Belt, 3 miles south of West Point. A 2-foot quartz vein in talcous gouge zone. Ore minerals pyrite, galena, chalcopyrite and free gold in a quartz calcite gangue. (Logan 36a:244)
	Boston (Esperanza, Boston Consolidated)	Ed R. Solinsky, 1213 Hobart Bldg., San Francisco (1939)	5	5N	12E	MD	Class D. Gold mine located 3 miles from Mokelumne Hill on the Mother Lode. Comprises 3 patented claims and 6 claims held by location. A 10- to 50-foot quartz vein in limestone, schist and serpentine intruded by diorite. Gold occurs in pyrite and galena. Developed by 5 levels from a 1000-foot inclined shaft. Large gold production recorded. (Logan 25: 145-46; 36a:299)
	Boston Consolidated						See: Boston.
	Bower (Right Bower)	Western Quartz Mining Co., 703 First Natl. Bank Bldg., San Jose (1940)					Class D. Gold mine in the East Belt district; produced 1939-40 minor lead as a by-product from gold concentrates.
	Calaveras Copper						See: Copperopolis.
	Bright Star (Black Cat)	Aladdin Gold Mining Co. Ltd., Holbrook Bldg., 58 Sutter St., San Francisco. C. N. Miller, pres. (1936)	appr. 26	6N	12E	MD	Class D. Gold mine. Eight claims held by location 6 miles NE of Mokelumne Hill. Quartz veins 4 to 12 feet wide in slate intruded by porphyry dikes and granodiorite. Ore contains pyrite, galena and free gold. Reported production of $4500 to 1936. (Logan 36a: 245-46)
	Brown						See: Tullock.
	Bullion Hill						See: Washington.
	Campo Seco						See: Penn.

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Carson Hill	Carson Hill Gold Mining Co., San Francisco (1944)	13,14 17,18 19,20	2N 2N	13E 14E	MD MD	Class D. Gold mine on the Mother Lode. Faulted and crushed Calaveras phyllite and schist cut by large quartz vein; chloritized, carbonatized, and serpentinized wall rock in close proximity to ore. Minor sulfides associated with the high-grade. Total production recorded over $20,000,000 in gold and silver between 1896 and 1948. About 6000 lbs. of lead have been recovered from concentrates shipped to smelter. (Burgess 37: 1-15; Eric 48: 218; Logan 35; 36a:300)
	Centennial (New Champion)	New Champion Mining Co., West Point (1950)	4	6N	13E	MD	Class D. Gold mine in the East Belt, 1½ miles west of West Point. Produced some lead and copper from concentrates between 1937 and 1950. Gold production over $12,000.
10	Collier (Blood)	E. A. Vogt, 407 Montgomery St., San Francisco (1943)	24	1N	11E	MD	Class C, Type 2. Complex sulfide deposit 5 miles east of Murphys. Quartz vein in siliceous slate, mineralized with pyrite, galena, sphalerite, arsenopyrite, antimony, and tellurides of gold and silver. This mine which was drilled by the U. S. Bureau of Mines in 1944, is developed by a 175-foot shaft and over 400 feet of drifts. Produced between 1942-44 over 5500 tons of 8% zinc, 1% copper, and 0.75% lead ore with gold and silver. (Aubury 05: 197; 08:244; Averill 43b: 313; Eric 48: 219; Logan 36a: 249, 301; Tucker 16a: 57)
	Copper Hill						See: Penn.
11	Copperopolis (Keystone, North Keystone, Union, McCarty and others)		3 34	1N 2N	12E 12E	MD MD	Class D. Type 2. Lenticular lenses of massive sulfides replacing greenstone along shear zones. Chalcopyrite, pyrite, sphalerite, gold and silver, also minor galena. Large copper production from 1902-30; silver, gold, and some lead were also recovered. The operators during this period were Calaveras Copper and Union Copper Company.

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Copperopolis (Keystone, North Keystone, Union, McCarty and others) (continued)						(Aubury 05:189-94; 08:229-38; Browne 67:139; 68: 211-212; Eric 48:219; Forstner 08:746; Hanks 84:148; Heyl 44b; 48:93-110; Knopf 06:418-422; Lang 07: 1007-1008; Logan 23: 98; 24: 4; 24a: 76-80; 25:143; Neale 27: 444-446; Preston 93:167-168; Rand 31:511-514; Reid 07; 08; Tolman 35: 247; Tucker 16a: 62-63; Zimmerman 37:188)
	Donner	R. B. Smith, Campo Seco (1952)	appr.	2N	12E	MD	Class D. Type 2. New producer in the Foothill Belt; located near Mountain King. Ore similar to Penn and apparently located along the same mineralized shear zone. It is reported that the ore carries commercial amounts of gold and silver as well as copper and zinc.The flotation mill at the Mountain King property is to be used to mill ore from the Donner. (Mining & Industrial News, vol. 20, no. 11, Nov. 1952, p. 3.)
	Eagle						See: Quail Hill.
	Easy Bird (LeRoi, Outlook, Pacific)	Pacific Gold Mining Company, Max Muller, Nogales, Arizona Leased to: LeRoy Mines Inc., Jackson (1941)	$W\frac{1}{2}$ 6	5N	12E	MD	Class D. Comprises 400 acres unpatented $3\frac{1}{2}$ miles north of Mokelumne Hill. Gold mine with associated pyrite and galena in quartz vein in granodiorite. Lamprophyre dikes in close proximity to ore. Former operators, E.R. Abadie (1925) and Lucky Joe Gold Mining Co., J.G. Donaldson, Pres., (1936) (Logan 25:140, 152; 36a: 303)
	Empire	Frank Towers, Felix (1938)	29,30	2N	12E	MD	Class D. Gold mine located $3\frac{1}{2}$ miles NW of Copperopolis. Quartz vein and stringers cut by calcite veinlets in chlorite schist and diabase dikes. Ore contains pyrite, galena, sphalerite, and free gold. Footwall is slate. Recorded gold production 1936-39, also silver, copper and lead. Mine is developed by a 300-foot inclined shaft and equipped with a 25-ton mill and 60-ton flotation unit (1938). Now included with the Copperopolis group. (Eric 48: 219; Logan 36a: 253-254)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Enchantress						See: Old Calaveras.
	Esperanza						See: Boston.
	Fidelity	Ed Gilomen, R.F.D. 1, Mokelumne Hill (1936)	appr.	6N	13E	MD	Class D. Gold mine located 8 miles NE of Mokelumne Hill. Quartz vein 18 inches wide in slate and quartzite near granodiorite contact. Ore contains pyrite and free gold with small amounts of galena. (Logan 36a: 255)
	Fine Gold	W.P. Caubu, Humboldt Bank Bldg., San Francisco (1941) Operator: Fine Gold Mining Co., Charles A. Thomas, 2257 Cambridge Street, Los Angeles (1949)	19,29	6N	14E	MD	Class D. Gold mine about 4 miles east of Railroad Flat in the East Belt. A 6-inch to 6-foot quartz vein in Calaveras slate at diorite contact. Developed by a 267-foot, 72- degree incline with 300 feet of drifts. Produced 1935-49 intermittently about $75,000 in gold and silver. Minor lead and copper were recovered in concentrates shipped to smelter. (Logan 36a: 255-256)
	Ford (Apex)	Mrs. A. Dower and T. Hawes, San Francisco (1935)	16,17	4N	12E	MD	Class D. Gold mine located ½ mile east of San Andreas. Located in 1895 by W. M. Ford of San Andreas. To 1899 had produced about $9000 in gold-silver. The Apex Mining Co. of San Andreas mined a small tonnage in 1924 from which was recovered a small amount of lead and copper, as well as gold. (Eric 48:220; Logan 36a:297)
	Forest Creek	Forrest Creek Mining Co., D. Terhorst, Pres. (1925)	appr.	7N	13E	MD	Class D. Gold mine near West Point in the East Belt. Ore contained pyrite, galena, pyrrhotite, sphalerite, marcasite, arsenopyrite, and chalcopyrite in addition to free gold. (Logan 25:140-41, 153)
	Galena-Gold Hill (Gold-Galena)	Winsor Investment Co., 6th and K Sts., Sacramento, Mr. Breuner, Pres. (1936)	appr.	7N	13E	MD	Class D. Gold mine 2 miles NE of West Point on the ridge SE of Skull Flat in the East Belt. Galena and pyrite in quartz vein in granoidiorite. High assays reported. Mine closed in 1936 due to water trouble. (Logan 36a: 258)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Goat Ranch						See: Nassau
	Gold-Galena						See: Galena-Gold Hill
	Gold Star	R.F. Funston, West Point (1935) Lease to: William De Witt	appr.	7N	13E	MD	Class D. Gold mine 4½ miles east of West Point; 4-foot quartz vein reported to assay $53 in lead and free gold. Other sulfides present also. (Logan 36a:261)
	Golden Scherer						See: A.V.G.
	Gopher Hill	W.W. Murphy, Milton, California (1934)	appr. 10	1N	11E	MD	Class D. Gold mine located on Buckhorn Creek, 9 miles SW of Copperopolis. Vein consists of quartz and included silicified porphyry. Base ore of pyrite, galena, gold and silver, and traces of arsenic and bismuth. Developed by an 80-foot shaft with 30-foot and 80-foot levels. No recorded production. (Eric 48:122; Logan 36a:262)
	Hecla						See: Penn
	Hinckley						See: Penn
	Ibex (Tiger, Anglo-Saxon)	M. Loughhead, R.F.D. 1 Mokelumne Hill	35	6N	12E	MD	Class D. Gold mine located six miles east of Mokelumne Hill. Quartz veins near contact of mica schist and greenstone dike with granodiorite. Ore contains antimony, copper, iron, lead, and zinc sulphides with some free gold. No recorded production. (Logan 36a:264-5)
	Ingomar	Arnoldo Moss, San Jose Leased to: Ingomar Mining Co., c/o J.J. Williams, Sacramento	34, 35	5N	10E	MD	Class D. Gold mine comprises 100 acres 1½ miles NE of Campo Seco on a ridge south of the Mokelumne River. Quartz vein between amphibolite schist and talcose slate; width 10 feet. Mineralized with pyrite, chalcopyrite, galena, and gold, in lens-shaped bodies in schist. No recorded production. (Logan 36a:265; Tucker 16a:58)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Janie Boyd (Homes, Sanchez)	William Arbunarus Campo Seco Leased to: R.T. Hamilton, 882 Cleveland Ave. Oakland	2,11	4N	10E	MD	Class D. Gold mine. Comprises 247 acres patented, $\frac{1}{2}$ mile SE of Campo Seco. Twelve parallel quartz-calcite fissure veins 8 inches to 6 feet wide in slate and greenstone. Ore contains free gold, pyrite, galena, sphalerite, and chalcopyrite. No recorded production. (Logan 36a:266)
	Jones	M.H. Manuel, Murphys (1936)	appr.	2N	13E	MD	Class D. Gold mine 3 miles south of Angels Camp. Base ore containing zinc and tellurides of gold and silver. No recorded production. (Logan 36a:267)
	Keystone						See: Copperopolis
	Lamphear	C.W.Blackburn, Mokelumne Hill (1935)	18	5N	12E	MD	Class D. Gold mine located 1 mile south of Mokelumne Hill. A 6 to 11 foot vein. Concentrates are $3\frac{1}{2}$% of the ore; of this 1% is galena. Vein assay $4.80 in gold, concentrates $60.00. A small production recorded. (Logan 25:155)
	LeRoi						See: Easy Bird
	Liberty Bell	Ed King and W.T. Treat San Andreas	21	6N	13E	MD	Class D. Gold mine twelve miles NE of Mokelumne Hill. Three quartz veins 6 inches to 5 feet in width occur at slate and granite contact. Ore contains free gold, pyrite, and galena. Reported assay $18.00. Developed by an 80-foot shaft with a 60-foot drift on the 80-foot level. (Logan 36a:268)
	Little Gulch (Opal, Red Wonder)	Carroll Evans and D.E. Hayes, 1144 Yale St., Santa Monica Leased to: Wallace Bros., Pomona	1	6N	13E	MD	Class D. Gold mine. Three claims, $2\frac{1}{2}$ miles east of West Point. Ore found at the intersection of quartz veins and diorite dikes; consists of pyrite, arsenopyrite and galena with gold values. High assays reported. Developed by a 90-foot vertical shaft with a 45- and 90-foot level. No recorded production. (Logan 36a:268-269)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mar John						See: Old Calaveras.
	McCarty						See: Copperopolis.
	Mikado	M. E. Taylor and Mr. Striker, Railroad Flat (1936)	appr.	6N	13E	MD	Class D. Gold mine located in the East Belt, $\frac{1}{2}$ mile south of Railroad Flat. A 3-foot vein mineralized with galena, free gold, and other sulfides. Developed by 110-foot inclined shaft (1936). Recorded gold production in 1936-37.
	Moser						See Mother Lode Central.
	Mother Lode Central (Moser)	Mother Lode Central Mining Company, 216 Pine Street, San Francisco (1939)		2N	13E	MD	Class D. Gold mine located $1\frac{1}{2}$ miles south of Angels Camp. Developed by a 530-foot 2-compartment shaft, and a 230-foot 3-compartment shaft; also 1600 feet of drifts, 500 feet of crosscuts, and 600 feet of raises. The footwall is slate and the hanging wall is greenstone. Produced 1936-39 about 15,000 tons of gold ore which contained, besides gold and silver, a small but recoverable amount of copper and lead. (Logan 36a:276)
	Mountain King	Jumbo Construction Mining Company, Santa Monica (1942), LeRoy Holt, Copperopolis (1948)	19,30 24	2N 2N	12E 11E	MD MD	Class D. Gold mine 3 miles NW of Copperopolis. Developed by an 800-foot shaft. Equipped with 700-ton amalgamation-flotation mill. Large recorded gold-silver production, also some copper and lead. (Eric 48:221; Logan 36a: 313)
	Murphy Divide	Frank Grenitta, Douglas Flat Leased to: Don Steffa, Murphys and T. H. Lipps, Los Angeles (1934)		3N	14E	MD	Class D. Gold mine. Comprises 18 acres patented, $\frac{1}{2}$ mile east of Murphys. Quartz vein in limestone; 10% lead reported as well as gold and silver. Developed by 150-foot shaft and levels at 50, 100, and 150 feet. No recorded production. (Logan 36a: 277-278)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
12	Napoleon	E.H. Nutter, Rt. 2, Box 344, Redlands Lease to: Mountain Copper Co., Ltd., 216 Pine Street San Francisco (1943)	23	1N	11E	MD	Class C (?), Type 2. Located 6 miles SW of Copperopolis in the Foothill Belt. Quartz porphyry and felsite intruding metavolcanics of the Amador group. Similar to Quail Hill and Penn. Pyrite, chalcopyrite and sphalerite in quartz porphyry and greenstone along shear zones which cut the schistosity at an angle of 40 degrees. Diamond drilled in 1942-3 by the Mountain Copper Company. Large recorded copper production. Zinc production undetermined. (Aubury 05:197-8; 08:242-3; Averill 43:72; 43b:314; Browne 67:139,147; Eric 48:221; Forstner 08:747; Heyl 48:122-4, pl. 45; Knopf 06:422-3; Logan 26a:372-3; 36a:314; Neale 27:509; Tucker 16a:58; Weed [illegible]; 16:805; 20:462)
13	Nassau (Goat Ranch, Poole)	J.E. Knapp Co., San Francisco (1943)	10	2N	12E	MD	Class C (?), Type 2. Foothill copper mine; chalcopyrite, sphalerite in green schist along shear zones. Ore bodies are lenticular. General assay reported: gold 0.2 oz., silver 4.6 oz., copper 5.22%, zinc 17.9%, silica 39%, iron 11.9%. Large recorded copper production. Zinc production undetermined. (Aubury 05:198; 08:245; Eric 48:221; Forstner 08:744, 747; Logan 36a:306; Neale 27:509; Tucker 16a:58-9; Weed 16:805-6; 18:578)
	New Champion						See: Centennial
	North Keystone						See: Copperopolis
	Norwich (Nucleus)	Norwich Mining Co. G.A. Scott, pres., Mokelumne Hill Leased to: K.E. and W.E. Burton (1935) Joe King (1936)	appr.	6N	13E	MD	Class D. Gold mine comprising 120 acres, 9½ miles NE of Mokelumne Hill, in the East Belt. Quartz vein up to 12 feet in width, outcrops for 2200 feet. Ore reported to contain $18.00 in free gold, galena and other sulphides. Developed by a 200-foot, 45-degree incline with levels at 125 and 200 feet. (Logan 35a:278; Tucker 16a:278)

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Nucleus						See Norwich.
	Old Calaveras (Enchantres, Mar John, Oro Minto)	Wm. M. Nuner and John Waters Estate, San Andreas Leased to: R. C. Johnson (1924) Mar John Mines Co., Sheep Ranch, Calif. (1933) Walter F. Hoppe, Angels Camp (1938)	21 lots 46,47	4N	14E	MD	Class D. Gold mine located 6 miles north of Murphys; 2- to 5-foot quartz vein in Calaveras schist and slate, mineralized with free gold, pyrite, galena and sphalerite. Developed by 110-foot, 450-foot, and 350-foot shafts, 2300 feet of drifts and cross-cuts. Large gold production recorded. (Logan 25: 157)
	Opal						See: Old Gulch.
	Oro Minto						See: Old Calaveras.
	Oro y Plata	California Gold Mines Inc. (1946) Former operator: Union Consolidated Mining Co., 155 Montgomery St., San Francisco	5,6	3N	14E	MD	Class D. Gold mine. Comprises 153 acres, patented. Located $9\frac{1}{2}$ miles from Angels Camp. A network of quartz veins in limestone intruded by dikes. Ore contains galena, sphalerite, tetrahedrite, stibnite, and free gold. Early production prior to 1881; poor recovery. Property equipped with 60-ton flotation unit in 1929. Developed by a 1000-foot tunnel and 300-foot inclined shaft. Recorded production of gold-silver in 1896, 1927-42. Minor copper and lead also recovered. (Logan 36: 278-81)
	Outlook						See: Easy Bird.
	Pacific						See: Easy Bird.
	Patsy Bob (Rio Vista)	Rio Vista Mining Co., Sonora	appr.	2N	13E	MD	Class D. Patented gold claim $1\frac{1}{2}$ miles SW of Melones on the west slope of Stanislaus River. A series of parallel quartz veins with a maximum width of about 2 feet, spaced at a maximum interval of about 8 feet apart over a total width of 240 feet. Porphyry dike footwall,

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Patsy Bob (Rio Vista) (continued)	Lease to: N. S. Naughten E. F. Casenare, Melones (1936)					slate hanging wall. Ore carries pyrite, chalcopyrite, arsenopyrite, galena, free gold, and tellurides. Assay reported $13.50 over the 240-zone. No recorded production. (Logan 36a: 281-82)
14	Penn (Campo Seco, Copper Hill, Hecla, Hinkley, Penn Chemical, Satellite)	Penn Chemical Co., Campo Seco (1953)	3,4 33	4N 5N	10E 10E	MD MD	Class A. Type 2. Sericitized, silicified and pyritized zones along shear planes in metavolcanics intruded by quartz porphyry. Ore is replacement bodies of pyrite, sphalerite, chalcopyrite, bornite, tetrahedrite, and galena. Gangue minerals are barite, calcite, and quartz. Production to 1946 was 850,000 tons of ore which yielded 79 million pounds of copper and appreciable amounts of gold and silver. Over 12 million pounds of zinc was recovered between 1943-46 from ore containing 7½ percent zinc which had earlier been by-passed. Between 1947 and 1952, over 100,000 tons of 1.14% copper, 4.94% zinc, and 0.338% lead were produced. Gold-silver values ran about $3.00 per ton during this period. The principal workings are three near vertical shafts aggregating about 4600 feet. The mill closed in September 1952 when ore reserves were exhausted; a D.M.E.A. contract for $169,000 has since been made with the government. A diamond drill program to explore the "West-vein" between the 1100- and 2000-foot levels is underway. (Aubury 05:194-6; 08: 238-42; Browne 67: 146; 68: 212; Crawford 96: 57; Eric 48:222; Forstner 08: 746; Hanks 84: 148; Heyl 48: 61-84; Irelan 88: 152-56; Julihn 38: 112-16; Knopf 06: 415-18; Logan 26a: 372-74; 36a: 298; Mining World 52: 21-24; Tolman 35: 247-50; Tucker 16a: 59-62; Wiebelt 48: 1-6; 48a: 99-105.
	Pine Log	Will Halloran, Milton (1941)	19, 24	2N 2N	11E 12E	MD MD	Class D. Gold mine located 4 miles NW of Copperopolis. Developed by 5 vertical shafts, the deepest being 125 feet; also over 1000 feet of drifts. Produced 1938-41,

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Pine Log (continued)						small gold-silver production recorded. Recovered lead not recorded. (Logan 36a:285-87)
	Plymouth Rock	F.S. Tower and J.B. Canada, Milton (1933) H. E. Barker, Jenny Lind (1935)	23	3N	10E	MD	Class D. Gold mine. Altered diabase cut by quartz veinlets and mineralized with auriferous sulfides, pyrite, chalcopyrite, galena, and sphalerite. Developed by a 220-foot shaft and 1000 feet of drifts. Intermittent production between 1890 and 1933. Shipments made in 1917 and in 1933 contained about 1½% combined lead and copper. (Crawford 96:115-16; Eric 48:222; Logan 36a:316)
	Poe Quartz	Edgar Poe and Morris Taylor, Railroad Flat	appr.	6N	13E	MD	Class D. Gold mine located ¼ mile west of Railroad Flat. A 2-foot quartz vein mineralized with galena, pyrite, and free gold. Developed by a 90-foot shaft and 30-foot drift. No recorded production. (Logan 36a:282)
	Poole						See: Nassau
15	Quail Hill (Eagle)	G. Ivan Smith, 433 East Florence Avenue, Bell (1943)	3,10	1N	11E	MD	Class B, Type 2. Mine located 6 miles SW of Copperopolis. Wallrock is metavolcanics intruded by quartz porphyry. Ore is in pods and lenticular masses along shear zones. Ore minerals are sphalerite, chalcopyrite, pyrite, gold, silver and small amounts of galena. Developed by a 300-foot shaft, 1200 feet of drifts, and 900 feet of diamond-drill holes. Produced 1917 to 1920, 1938 to 1945, 12,000 tons of complex ore. Zinc was recovered only during the last period of operation. Gold, silver, and lead were also recovered. (Aubury 05:197; 08:244; Averill 43b:314; Browne 67:139; Eric 48:222; Heyl 44c; 48:111-26; Silliman 68:93-95; Tucker 16a:57,62)
	Right Bower						See: Bower

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Royal	Frank S. Tower, Milton (1936) Joe Paltor, Copperopolis (1950)	24 19,20, 29,30	2N 2N	11E 12E	MD MD	Class D. Gold mine located 3 miles NW of Copperopolis in Salt Springs Valley. Quartz fissure cut by calcite veinlets, in a diabase dike. Ore minerals are pyrite, sphalerite, galena, and free gold. Developed by a 1300-foot inclined shaft, several miles of drifts, and 600 feet of diamond-drill holes (1941). Produced 1897 to 1950, over 350,000 tons of gold ore. Concentrates contained minor amounts of lead and copper which were recovered at the smelters. (Logan 36a: 285-287)
	Satellite						See: Penn.
	Sheep Ranch	C. L. Feusier, 1067 Green St., San Francisco (1936)	appr. 7	4N	14E	MD	Class D. **East** Belt gold mine located on a ridge between San Antonio and O'Neils Creek at an elevation of 2250 feet. Quartz stringers in silicified Calaveras schist produced $4,000,000 in gold-silver. Ore is composed of free gold and auriferous sulfides, pyrite, galena, and sphalerite. No record of base-metal recovered. (Eric 48:222; Logan 25: 158-59; 36a: 288)
	Star Excelsior	W. A. Nuner, San Andreas (1936) St. Josephs Lead Co., New York City, New York (1942)	24	1N	11E	MD	Class D. Type 2. Mine located 6½ miles SW of Copperopolis. Similar to Collier and Napoleon mines. Silicified and kaolinized quartz porphyry mineralized in a zone of shearing 10-50 feet by at least 350 feet. Ore minerals chalcopyrite, pyrite, sphalerite, and oxidized copper minerals. Barite is common in the siliceous gangue. (Aubury 05: 197; 08: 244; Eric 48:223; Heyl 48:125-26; Logan 36a: 319; Tucker 16a: 62)
	Tiger						See: Ibex.
	Total Wreck	Chas P. Snyder, San Andreas (1936)	appr. 30	4N	14E	MD	Class D. Gold mine located 1 mile NW of Murphys. A 4- to 5-foot quartz vein mineralized with free gold, auriferous pyrite, and galena. Developed by a 150-foot vertical

CALAVERAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Total Wreck (continued)						shaft. No recorded production. (Logan 36a: 290-291)
	Tullock (Brown)	James Tullock Estate (Mrs. Lillie Bisbie and Mrs. Emma Sell, Sonora) Option by: Domingo Rolleri, Angels Camp. Subleased to: Norman Gilkey and C. R. Watkins, 330 North Rampart, Los Angeles (1936)	11	2N	13E	MD	Class D. Gold mine located 2½ miles south of Angels Camp on Albany Flat. Quartz vein in slate mineralized with gold and silver associated with galena. Vein strikes N 50° W, dips 45° NE. Developed by an 800-foot vertical shaft. Produced 1910 to 1936 intermittently, about 7000 tons of gold ore.
	Union (Keystone-Union)						See: Copperopolis.
	Washington (Bullion Hill)	W. Osselin Leased to: Bullion Hill Mining Co., (1921-23) Washington Gold Mining Company, Jack Hibbard, Pres., (1925)	20	4N	14E	MD	Class D. Gold mine located 6 miles north of Murphys; comprises 5 claims and a fraction. Quartz vein 3 to 6 feet wide mineralized with free gold, auriferous pyrite, galena, and traces of zinc, antimony, and manganese. Sulfide content about 10%. Developed by a 1250-foot adit with a 400-foot inclined winze. (Logan 25:160-61; 36a: 294)
	Unknown	W. T. Benson, Milton (1940)					Class D. A shipment of gold-silver ore made in 1940 contained in addition to gold-silver, about 3% combined copper and lead.
	Unknown	William Eddv and Jack Shiffer, Mokelumne Hill (1941)					Class D. Shipped gold-silver ore in 1941 which contained some copper and lead in addition to gold-silver.

DEL NORTE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Monumental Consol.	Raymond Michell and E.C. Mathews, 520-F Street, Eureka (1950)	1	18N	3E	H	Class D. Gold prospect located on Shelley Creek, northwest of the settlement of Monumental. Gold ore shipped to smelter in 1950 contained minor lead and copper.
	Prudential		2	18N	2E	H	Class D. Gold prospect. Two north-trending ore bodies mineralized with gold, copper, and zinc. Developed by adit and shaft. (Aubury 05:116; 08:139; Eric 48:227)

EL DORADO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Beebe	Pacific Mining Co., 1022 Crocker Bldg., San Francisco (1942)	2,11 15,16	12N	10E	MD	Class D. Gold mine located 18 miles NE of Auburn. The ore occurs in a silicified zone dipping 80° E in amphibolite schist. Stope widths average 12 to 15 feet with assay walls. Developed by a 500-foot inclined shaft. Produced 1923 to 1942 about 360,000 tons of gold ore. Minor lead and copper was recovered as well as gold-silver. (Eric 48:228; Logan 38:217)
	Big Canyon (Oro Fino)	Mountain Copper Co., Ltd.,351 California St., San Francisco (1940) Bradley Mining Co., San Francisco (1943)	29	9N	10E	MD	Class D. Gold mine located about $4\frac{1}{2}$ miles south of Shingle Springs. Ore occurs in a vein striking N 25° E and dipping 40° SE in meta-andesite breccia and amphibolite cut by serpentine dike. Gangue minerals associated with ore are albite, ankerite, and quartz; ore minerals are gold,arsenopyrite, pyrite, chalcopyrite, sphalerite, and galena. Developed by a 650-foot inclined shaft and several thousand feet of drifts. Total production over 500,000 tons of gold ore. Last operated between 1935 and 1940 during which time about 97,000 pounds of copper and 8,000 pounds of lead were produced as a by-product. (Eric 48: 228; Logan 38: 220-23)
	Big Buzzard (Darrington Ranch, Hercules)	Jane and George Darrington, Folsom (1922) P. F. Taylor, Folsom (1944)	SE$\frac{1}{4}$ 29	11N	8E	MD	Class D. Type 2. Mine located 12 miles east of Folsom. Vein in mica schist and amphibolite schist. Complex ore of pyrite, chalcopyrite, galena, and sphalerite with $14.00 in gold reported. Small recorded production in 1943-44. (Averill 43: 72; Engel 49: 1-12; Eric 48: 229; Logan 38: 213; Root 26: 406)
	Briarcliff	Briarcliff Mines Ltd., London, Ontario Operator: A. J. Anderson, Plymouth	1,12	8N	10E	MD	Class D. Gold mine located 8 miles south of El Dorado, one mile from Highway 49. Siliceous vein striking N 10° E dipping 72 degrees NE lies between amphibolite schist in the hanging wall and slate in the footwall. In 1932-

EL DORADO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Briarcliff (continued)						1941 the property was developed by several thousand feet of underground workings including a 518-foot shaft and 900-foot tunnel. A winze off this tunnel with levels at 125, 275, and 500 feet constitutes the deepest workings. Total production is over 40,000 tons of gold ore which contained small amounts of recoverable lead and copper. (Logan 38:226)
	Buzzard						See: Big Buzzard
	Cosumnes (Middle End)	Cosumnes Mines Inc., Grizzly Flat (1942) Henry Williams and George Thomas, Jackson (1943)	24, 25	9N	12E	MD	Class D. Gold mine. Vein mineralized with auriferous sulfides of copper and lead, cuts limestone and amphibolite schist which is intruded by granite. Developed by adits and tunnels aggregating over 1000 feet. The maximum width of stopes is 30 feet. Produced a moderate tonnage of gold ore between 1928 and 1951 from which was recovered about 10,000 pounds of lead and some copper in addition to gold-silver. The mine is equipped with a 60-ton ball and flotation mill. (Aubury 05:178; 08:214; Crawford 96:58; Eric 48:229; Logan 26b:408; 38:213; Pabst 38:28)
	Darrington Ranch						See: Big Buzzard
	Eagle King	Eagle King Mining Co., Grizzly Flat	4,9	9N	13E	MD	Class D. Gold mine located in the East Belt, 1$\frac{1}{2}$ miles NW of Grizzly Flat. Moderate gold-silver production; some lead recovered in concentrates.
18	El Dorado Copper	Calivada Development Co., H.A. Weiler and Hal T. Hall, Box 4, Garden Valley	SE$\frac{1}{4}$24 NE$\frac{1}{4}$3	12N 11N	10E 10E	MD MD	Class D, Type 2. One patented and one unpatented claim, near Highway 12, 1 mile south of Garden Valley. Exploration by U.S. Bur. of Mines by means of 11 diamond drill holes totaling 1613 feet indicated narrow intermittent lenses of copper ore along a structure 600 feet in length The sulfides, chalcopyrite, pyrite, pyrrhotite, with minor bornite and sphalerite replace tuffs interbedded

EL DORADO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	El Dorado Copper (continued)						with Mariposa slates. About 75 tons of ore was stockpiled at the mine as a result of development prior to the visit by the U.S. Bur. of Mines. Development work in 1951 consisted of 125-foot shaft, 170 feet of drift, and 170-foot tunnel. A second shaft 75 feet deep with a 50-foot drift was also completed. A small production of copper-zinc ore is recorded for this period. (Bedford 46: 1-5; Eric 48:230)
	Fox	H.H. Smith, Placerville (1924)	4	10N	10E	MD	Class D. Gold mine; also silver-lead. (Eric 48:230)
	Funny Bug						See: Pendelco
	Gopher Hill	Walter Murphy, Milton (1936)	11	11N	10E	MD	Class D. Silver-gold mine with recoverable lead and copper. Produced 1935 and 1936. Developed by an 80-foot shaft and several hundred feet of drifts.
	Hazel Creek	Hazel Creek Mining Corp., 463 Main St., Placerville (1953)	S$\frac{1}{2}$SE$\frac{1}{4}$ 3	10N	13E	MD	Class D. Gold mine located on Hazel Creek 6 miles SE of Pollock Pines. East Belt mine with free gold associated with galena, some pyrite and chalcopyrite in two parallel quartz veins with a maximum width of about 30 feet. The veins are near vertical and are connected by a cross-vein on the main level. A shaft at the portal of the main adit has been sunk on the vein about 150 feet proving the extension of the ore in depth. Produced 1948 to 1953 over 50,000 pounds of lead as a by-product. In country rock is Calaveras slate, quartzite, and schist, intruded by aplite dikes which have been altered to a fine grained epidote-clinozoisite-quartz rock.
	Hercules						See: Big Buzzard

EL DORADO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Humbug	E.W. Morey, Grizzly Flat (1937)	16	9N	13E	MD	Class D. Gold mine; also silver and lead. Developed by a 300-foot tunnel and 50-foot and 30-foot shafts. Small production between 1919 and 1937. Ore contained recoverable lead and copper in addition to gold-silver. (Eric 48:230; Logan 38:241)
	Melton	Miller Gold Mining Co., Consumnes Mines Inc. (1938)	appr. 3	9N	13E	MD	Class D. Gold mine located on the Consumnes River 2½ miles north of Grizzly Flat. A 3-foot vein striking north in granodiorite is mineralized with free gold, pyrite, galena, sphalerite, chalcopyrite and some antimony. No recorded production. (Logan 38:238)
	Middle End	Consumnes Mines Inc., Grizzly Flat (1939)	3,4	9N	13E	MD	Class D. Gold mine; also silver and lead. (See also Cosumnes.) (Eric 48:231; Logan 38:265)
	Morey						See: Humbug
	Mount Pleasant	E.W. Morey, Grizzly Flat (1941) J. D. Elliot, Placerville (1943)	16	9N	13E	MD	Class D. Gold mine located 1 mile from Grizzly Flat. Series of parallel veins in granodiorite near contact with mica schist. Veins of ribbon quartz are mineralized with gold, pyrite, galena, sphalerite, and some copper sulfides. Reported production of over $1,000,000 from 75,000 tons of ore. Recorded production of over $100,000 between 1890 and 1941. Minor lead recovered also. Underground workings extensive. (Eric 48:231; Logan 23:210; 38:241-242)
	Oro Fino						See: Big Canyon

EL DORADO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Pendelco (Funny Bug)	Pendelco Co., Ralph Penn (1937) H. H. Smith, Placerville (1943) Lease to: Volo Mining Co., Placerville (1943)	SE¼ 5	10N	10E	MD	Class D. Gold mine located 7½ miles west of Placerville by road. Veins in fractured augite-diorite dike, in granodiorite. A reported shipment of 4 tons in 1929 which contained besides gold, copper, lead, zinc, antimony,arsenic, and molybdenum. Developed on several levels from a 200-foot shaft. (Eric 48: 230; Logan 38: 242)
19	**Pioneer-Lilyama**	Morning Star Mining Co., 1210 Quinby Bldg., 650 S. Grand Street, Los Angeles (1948)	3,9	11N	9E	MD	Class D. Type 2. Complex sulfide deposit located about 14 miles south of Auburn. Produced 1941 to 1948, about 20,000 tons of ore containing in addition to gold-silver, 1.17% copper and recoverable lead and zinc. (Aubury 05: 176-77; 08: 212-13, 218; Averill 43: 140; Eric 48: 231; Logan 26b: 408; 38: 213; Tucker 19c: 277, 278)
	Sliger	Middle Fork Gold Mining Co., Auburn (1942)	25, 36	13N	9E	MD	Class D. Gold mine. Silicified and carbonated slate and schist is impregnated with auriferous sulfides which constitute 3.7% of the ore. The mineralized zone is from 1 to 32 feet wide along a fault. Development consists of 1050-foot inclined shaft, several shallow shafts, several thousand feet of drifts, and 1623 feet of diamond drill holes. A large recorded gold production between 1927 and 1942. Recoverable lead and copper were present in concentrates shipped. (Eric 48: 232; Logan 38: 250)
	Zantgraf (Montauk Consolidated)	H. B. Droscher, Sacramento (1941) Operator: A. I. Rodriques, 5950 Margarido Drive, Oakland 45, California	16,17 20,21	11N	8E	MD	Class D. Gold mine located 9 miles SW of Auburn, on the east side of the American River, near Rattlesnake bridge. Parallel veins in granodiorite and amphibolite schist accompanied by diorite dikes. Pyrite and galena form up to 1½% of the ore below the 600-foot level in the unoxidized ground. Recorded production of about $351,000 in gold-silver between 1898 and 1901. Small production between 1936 and 1941 also. Developed by a 1100-foot inclined shaft and a 200-foot vertical shaft. Developed at 100- foot intervals. (Logan 38: 255-257)

EL DORADO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Unknown	Austin Barcham, Grizzly Flat (1948)	appr.	9N	13E	MD	Class D. A small shipment of highgrade gold ore in 1948 contained about 2% lead in addition to gold-silver.
	Unknown	Dodson Copper Mine San Jacinto (1943)					Class D. Type 2. Small shipment of copper-silver-lead ore in 1943 contained about 3% copper, 0.5% lead, and 1 ounce of silver, per ton.

FRESNO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
20	Copper King (Hart)	John Davis, Sanger (1943)	2,3, 10,11	12S	23E	MD	Class C (?). Type 2. Complex sulfide deposit in the Foothill Copper Belt. Quartz stringers cutting amphibolite schist intruded by granite. Ore minerals are pyrite, chalcopyrite, and some galena and sphalerite. Produced over 5,000,000 pounds of copper between 1902 and 1917, plus appreciable gold and silver. There is no record of lead and zinc produced. (Aubury 05:226-230; 08:282-286; Bradley 16:437; Crawford 94:66; 96:59; Eric 48:233; Laizure 29:308; Lang 07:913, 963, 966, 1008, 1010; Logan 51:498-502; Neale 27:460; Rand 31:535)
21	Fresno Copper	John Parks, Los Angeles (1943)	10	12S	21E	MD	Class C (?). Type 2. Mine located 6½ miles NE of Clovis. Three lode claims patented in 1903 by H. B. Vercoe. Vein in sericite schist carrying pyrrhotite, chalcopyrite, pyrite, and some galena, sphalerite, gold, and silver. Operated 1909 and 1910 producing almost 2,000,000 pounds of copper. Lead and zinc production not known. (Aubury 05:226; 08:279-281; Bradley 16:437; Eric 48:233; Forstner 08:747; Laizure 29:226; Lang 07:911, 913, 963, 1008; Logan 51:498-502; Preston 93a:222)
	Hart						See: Copper King.

HUMBOLDT COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Copper Bluff	A.W. Scott, Happy Camp (1943) Providence Tuolumne Gold Mines Inc., A. Vannini, 210 Post St. San Francisco (1953)	2	8N	4E	H	Class D, Type 2. Zinc-copper prospect on the Hoopa Indian Reservation. A 7-foot vein or bedding replacement in pyritized schist assaying 5% copper, 14 to 17% zinc, 8 to 50 ounces of silver, $5.80 in gold, and 0.5 to 1.5% lead. Property being developed in 1953 by a $22,000 D.M.E.A. loan. Development consists of diamond drilling and drifting. J. Robertson of the U.S. Geological Survey is the examining geologist.

IMPERIAL COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Homestake	Vanya Laughlin and V. Bloomer, Brawley (1926)	appr.	11S	20E	SB	Class D, Type 1. Mine located 2 miles west of Midway Wells in the Paymaster district. Elevation 750 feet. Holdings comprise 3 claims. A 6-foot vein striking N 60 E and dipping 70 N, in granitic gneiss and monzonite is mineralized with argentiferous galena, much of which is oxidized to cerussite. Developed by a 75-foot shaft, 25-foot crosscut, and open cuts. No recorded production. (Sampson 42:127; Tucker 26:262)
	Little Buckaroo	W.D. Morrison, Box 1187, Yuma, Arizona (1952)	appr.	11S	20E	SB	Class D, Type 1. Lead-silver ore shipped from the Paymaster district in 1952 contained 15.8 percent lead and 10 ounces of silver.
	Marcella	Marcella Mining Co. Niland (1916)	appr.	9S	15E	SB	Class D, Type 2. Small production of ore in 1916 containing 7.25% lead, 2.42% copper and values in gold and silver. (Eric 48:237)
23	Mayflower	W.H. Trenchard, San Diego (1942)	11	14S	22E	SB	Class D, Type 1. Comprises 6 claims about 5 miles east of Picacho, 1 mile south of the Colorado River. Lead carbonate and galena in small veins and pockets in schist. Silver values in some assays ran as high as 90 ounces per ton. Developed by shallow shafts, 50 to 90 feet deep; also open cuts. No recorded shipments. (Sampson 42:127; Tucker 26:262)
24	Paymaster	William Green, Ogilby (1939) Former Operators: L.W. Jackson and Harold Jackson, Pasadena M.E. Stark, Beverly Hills	19, 30 24,25	11S 11S	20E 19E	SB SB	Class D. Type 1. Comprises 12 claims on the east slope of the Chocolate Mountains. Lead carbonate, galena, and silver chloride in a 15 to 30 foot vein between diorite and granite. The principal gangue mineral is calcite. Developed by a 1200-foot shaft and about 2 miles of drifts. Recorded production 1919 to 1921, and in 1939. The principal value was in silver. Reported assays show 8.2 to 10 ounces silver, 3.5 to 10% lead, and 0.15 to 0.16 ounces of gold per ton. (Sampson 42:127; Tucker 26:262-64)

IMPERIAL COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Red Cloud	Red Cloud Cons. Mine Co. (1918)					Class D, Type 1. Shipped silver-lead ore in 1918 containing 30 ounces of silver and 28.6% lead.
25	Silver King	Charles Kurton, Glamis, and R.D. Gunn and R.D. Glick, Colton	23	12S	19E	SB	Class D, Type 1. Two claims in the Chocolate Mountains, 14 miles NE of Glamis. Gold, galena, and copper oxides in aplite dike cutting gneissoid granite. Galena occurs in irregular branches along fractures in aplite dike. High assays reported. Developed by a 20-foot shaft. No recorded production. (Sampson 42:128)
26	Southern Star	C.E. Weaver, 105 East 1st St., Los Angeles (1926)	36 30	17S 17S	8E 9E	SB SB	Class D, Type 1. Consists of 4 claims, 4 miles SW of Coyote Wells (at 175 feet elevation). A 6-inch stringer in limestone reported to assay 20 to 60% zinc. (Tucker 26:267)
	Unknown	Charles Kurton and Bob Gunn, Glamis (1942)	appr.	12S	18E	SB	Class D, Type 1. Small shipment of lead-silver ore in 1942. Smelter assay 1.1% lead, 0.6% copper, 1.16 ounces silver, and 0.0914 ounces gold per ton.

INYO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Ajax						See: Queen of Sheba
	Alabama						See: Panamint. (Crawford 94:374; Davidson 02:4; Tucker 38:468)
	Alexander						See: Shoshone. (Sampson 37:268)
	Alturas	F. Barbour, Tecopa (1912)		20N	8E	SB	Class D, Type 2. Shipment of complex ore in 1912 assaying 0.445 oz. of gold, 85 oz. silver, 7% copper, and 4.85% lead.
	American						See: Wallace Wonder. (Tucker 38:468)
	American Fraction						See: Copper Queen group
27	Alva (Alvah)	Ingrald C. Boe, Box 123, Morro Bay	1	16S	38E	MD	Class D, Type 1. Lead-silver mine. (Norman and Stewart 51:168; Tucker 38:468, pl. 3)
28	American	J.W. Stalker, Shoshone	27?	21N	5E	SB	Class D, Type 1. Argentiferous tetrahedrite, chalcopyrite, and galena with some gold occurs in narrow vein worked by adits and shallow shaft. Made a small shipment of high-grade silver ore in 1937 and 1938, which ran over 100 ounces of silver per ton. (Eric 48:238; Norman and Steart 51:168; Tucker 26:476; 38:427,468, pl. 3; Waring 19:71)
	American Silver Corp.	American Silver Corp., Beverly Hills (1949)		21S	45E	MD	Class D, Type 1. Located in Surprise Canyon on the west slope Panamint Range. Comprises 12 patented claims and 42 unpatented claims. Three veins striking NE and dipping steeply NW have been developed by a 600-foot adit and several drifts. (Norman and Stewart 51:55-56)
	Anaconda	Panamint Mining Co. (1932)	4	21S	45E	MD	Class D, Type 1. Reported lead-silver-zinc-gold. Patented claim near Panamint City. (Murphy 32:5; Norman & Stewart

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Anaconda (continued)						51:168; Tucker 38:468, pl. 3)
	Anthony						See: Knob. (Norman and Stewart 51:145)
	Apex Consolidated						See: Shoshone. (Tucker 38:468, pl. 3)
	Arcturas (Ibex)						See: Ibex, San Bernardino County
30	Argenta	George Greist, Box 10 Trona	27?	18S	45E	MD	Class D, Type 1. Comprises 9 unpatented claims on the north side of Woods Canyon in the Panamint Range. Replacement bodies in limestone at contact with schist and quartzite. A 6 to 12 foot vein striking east, dipping north, is mineralized with galena, sphalerite, cerussite and smithsonite. The limestone is heavily stained with manganese and iron oxides adjacent to ore. Development consists of 630-foot adit with a 123-foot crosscut (N49° E) at a point 560 feet from the portal. Average grade of ore reported to be 12% zinc, 5% lead, 2.8 ounces silver, and 0.08 ounces gold per ton. No recorded production Reported to have shipped 70 tons. (Norman and Stewart 51:56, 168; Tucker 43:59)
31	Argus-Sterling	Carl Becker, Darwin (1923)	26	20S	41E	MD	Class C, Type 1. This mine now within the U.S. Naval Ord. Testing Sta., Inyokern. Quartz-filled fissure in limestone near granite contact. Worked by a 150-foot shaft, and 450-foot adit. Produced 1917 to 1923 ore averaging 15% lead, 4.25 ounces silver and some copper and gold. (Eric 48:238; Newman 23:740-741; Norman and Stewart 51:168; Tucker 21:283; 26:476-477; 38:427,468, pl. 3)
	Aries Consolidated						See: Cerro Gordo. (Tucker 38:468)
	Armagh (Armaugh)						See: Cerro Gordo. (Tucker 38:468; Davidson 02:4)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Arrow Head Rico	E.E. Northrop, Bonne Claire, Nevada (1920)					Class D, Type 1. Shipped ore in 1920; smelter recovery 2.9% lead and 33.8 ounces of silver per ton.
	Ashford						See: Golden Treasure
32	Aguereberry	Ambroise Aguereberry Box 10, Trona	24?	18S	45E	MD	Class D, Type 1. Mine located 2 miles east of Independent mine. Quartz vein in limestone worked by three adits. No record of production. (Murphy 29:108; Sampson 32:359)
	Bachelor No. 2	J.V. Lehigh, Los Angeles (1932)		21S	45E	MD	Class D, Type 1. Lead-zinc prospect. (Murphy 29:108; Sampson 32:359)
	Base Metal	Base Metal Mining Co. H.R. Link, Big Pine (1918)		10S	37E	MD	Class C, Type 1. Shipped lead-silver ore in 1917 and 1918 containing small amounts of gold and copper as well as 4 ounces of silver and 20% lead. (Eric 48:238)
33	Baxter (Jack Baxter)	J.P. Madison, Shoshone (1927)	3	23N	7E	SB	Class C, Type 1. Replacement bodies in dolomite. Produced 1915 to 1927. Smelter recovery was 13.6% lead, 1.31% zinc, 10.3 ounces silver, and 0.068 ounces of gold per ton. (Eric 48:238; Hazzard 37:298; Norman and Stewart 51:169; Tucker 21:283; 26:477; 38:427,468, pl. 3; Waring 19:88)
	Bean-Smith	R.C. Spear, Keeler (1909)		16S	39E	MD	Class D, Type 2. Small shipment of complex ore in 1909; smelter assay 0.064 ounces gold, 6.6 ounces silver, 5.86% copper and 31.6% lead. (Probably from the Darwin or Cerro Gordo districts.) (Eric 48:238)
	Belcher Extension Consolidated	Thomas J. Lynch, San Francisco (1926) Operator: Andy J. Kane, Trona (1926)	appr.	23S	43E	MD	Class D, Type 1. One shipment of ore from the Slate Range district, about 12 miles north of Trona, in 1926. Smelter assay 0.02 ounces gold, 12 ounces silver, and 15.8% lead.
	Bedell (Daisy LeRoy)	David T. Bedell, Big Pine		10S	37E	MD	Class D, Type 1. Galena and cerussite in fissures striking N30W., and dipping 45E. in limestone. Worked by adits and incline. No recorded production. (Newman 23:421;

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bedell (Daisy LeRoy) (continued)						Norman and Stewart 51:169; Tucker 21:285; 26:483; 38:427-428, 468, pl. 3; Waring 19:94)
34	Belmont	W. L. Hunter Estate Olancha (1947)	19	16S	39E	MD	Class D, Type 1. High-grade silver ore with some lead and copper in quartz veins. Worked by adit and shaft totaling over 3600 feet of underground development. A reported production of $500,000. (Crawford 94:23; 96:32; Eric 48:238; Goodyear 88:250-254; Norman and Stewart 51:169; Tucker 21:283; 26:477; 38:428,468, pl. 3)
	Bensons Last Stand	C. O. Benson, Shoshone (1941)					Class D, Type 1. Lead-silver mine in the Confidence district; developed by a 60-foot shaft, 75-foot tunnel, and 20-foot drift. Made a small shipment of ore in 1941, assaying 0.25 ounces gold, 5.25 ounces silver, and 50% lead.
	Bernon (Burnon)						See: Darwin Group. (Butner 49:5; Crawford 94:24; Kelley 38: pl. 6, pl. 7; Norman and Stewart 51:169; Stewart 49:56; Tucker 38:469, pl. 3)
	Berry Hill	C. L. Berryhill, Keeler (1918)		16S	39E	MD	Class D, Type 1. Shipped ore in 1911 and in 1918; smelter recovery 0.01 ounces gold, 15.1 ounces silver, 26.5% lead, and some copper. (Eric 48:238)
	Bess Ann	Stanley Gedvillas and George Birmingham, Box 929, Bishop (1949)					Class D, Type 1. Small shipment of ore in 1949; recovery 9.2 ounces silver, and 18% lead per ton.
35	Bertha Ann	F. G. Brown, et al., 3073 West 12th Place, Los Angelas	2	19S	41E	MD	Class D, Type 1. Prospect; zinc carbonate in dolomite. Developed by open cuts. (Norman and Stewart 51:169)
	Biddell	Biddell Bros., Big Pine (1918)	appr.	9S	35E	MD	Class D, Type 1. Small shipment of lead-silver ore from the Big Pine district in 1918. Smelter recovery 42.5%

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Biddell (continued)						lead and 12 ounces of silver per ton.
	Big Bell (Big Bell Consolidated, Frisco)	H. D. Porter, Beatty, Nevada and Marie MacPherson, 27 Arlington Avenue, Santa Barbara (1951)	29 12	30N 15S	1E 46E	SB MD	Class D. Oxidized gold deposit in the Chloride Cliff district. Developed by a 200-foot tunnel and 100-foot drift. Produced from 1939 to 1941 some lead and silver in addition to gold. (Norman and Stewart 51:145; Tucker 38:469, pl. 3)
	Big Bell Consolidated						See: Big Bell. (Tucker 38:469, pl. 3)
36	Big Four (War Eagle)	Mrs. Agnes Reid et al. Panamint Springs (1953) Operator: Foreman & Skinner, 1354 2nd Avenue, Salt Lake City, Utah (1949) Woody J. Lorenz, Box 364, Lone Pine (1952)	25	17S	42E	MD	Class C, Type 1. Consists of 3 claims on the east side of Panamint Valley, about 7 miles NE of Panamint Springs. The mine may be reached by a government access road from State Highway 190 in Panamint Valley, north along the west flank of the Panamint Range. Ore shipped in 1944 to 1949, and in 1952, was mainly cerussite and smithsonite from small stopes immediately underlying a low-angle fault which strikes east and dips north. The stopes, with a maximum height of 4 feet, have the same attitude as the controlling fault. The outcrop expression above ore is a large iron-stained, silicified halo. Mineralization appears to die out to the southeast along the fault but may continue to the northwest where the trace of the fault is concealed by basalt talus. Bleaching and dolomitization of the limestone increase in this direction. The mine is developed by several short adits. The last ore shipped (Selby and Toole) assayed 13.7% lead, 11.75% zinc, 2.9 ounces silver, with some copper and gold. (Eric 48:238; Norman and Stewart 51:57, 170)
37	Big Horn	S. R. Spear, Lone Pine (1939)	35?	14S	37E	MD	Class C, Type 1. Mine developed by a 90-foot shaft and 80-foot tunnel. Produced 1918 to 1939, intermittently, a moderate tonnage of ore assaying 20% lead, 3.48 ounces

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Big Horn (continued)						silver, 0.185 ounces gold, and some copper. (Eric 48:238; Tucker 38a:383, pl. 3)
	Big Pine	Big Pine Mining & Milling Company, Big Pine (1949)	appr.	9S	45E	MD	Class D, Type 1. Between 1920 and 1949, made several shipments to Midvale; smelter recovery was 9.65% lead, 4 ounces silver, and some gold and copper. Between 1893 and 1901 this mine produced gold-silver ore valued at approximately $4000.
	Big Silver (Essex)	Saline Valley Mining Co., A.B. Gandield, pres., 247 South Ardmore St., Los Angeles (1938)		14S	38E	MD	Class D, Type 1. Total of 10 claims on the east slope of the Inyo Range in the Ubehebe district. The ore is argentite, native silver, and galena in a quartz-calcite gangue along a limestone and quartz diorite contact. Ore occurs in a stockwork and in bedding replacement bodies. Reported to assay 30 ounces of silver and 2 to 9% lead. No recorded production. (Eric 48:238; Norman and Stewart 51:170; Tucker 26:478; 38:428, 469, pl. 3; 40:25-26)
	Big Wedge						See: Monte Carlo
	Birthday	J.E. Brown, Independence (1913)	appr.	13S	35E	MD	Class D, Type 1. Small shipment of ore from the Independence district in 1912 showed an assay of 24.2% lead and 23 ounces of silver per ton. In 1913 shipped small lot of gold-silver ore; also contained some copper.
	Bishop Creek (Cardinal)						See: Monte Carlo. (Tucker 38a:470)
38	Bishop Silver-Cobalt	Jack O'Brien, Big Pine (1938)	14	9S	31E	MD	Class D, Type 2. Complex sulfide prospect on the east flank of the Sierra Nevada, due east of Big Pine. Metamorphic rocks including dolomite reported to be mineralized along contact with crystalline rocks. Developed by open cuts and adit. (Norman and Stewart 51:170; Tucker 38:378-79, 469, pl. 3)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
39	Black Canyon (Hope Group, Mineral Point, Sangar)	Morris Albertoli et al. Box 655, Big Pine (1949)	13,14 23,24	7S	34E	MD	Class C, Type 1. Comprises 6 unpatented claims on the west slope of the White Mountains, in Black Canyon, 18 miles NE of Big Pine. Galena, sphalerite and some chalcopyrite in replacement bodies in limestone. The deposit is oxidized and cerussite and smithsonite constitute the bulk of the ore. Produced 1925 to 1927, and 1949 to 1950. The last ore shipped assayed about 14% lead, 3.9% zinc, 13.5 ounces silver, and some gold and copper. (Eric 48:247; Norman and Stewart 51:57, 170; Tucker 26: 489-490; 38:426, 444 - 445, 476, pl. 3)
	Black Cap	Al Lemke, Big Pine (1947)	appr.	7S	37E	MD	Class D, Type 1. Mine located 6 miles east of Deep Springs Ranch, in the White Mountains. Small tonnage of ore shipped in 1934 and 1947. Smelter assay 0.029 ounces gold, 17.6 ounces silver, 5.9% lead, and some copper. (Eric 48:239; Norman and Stewart 51:170)
40	Black Eagle	National Consolidated Mines Co., Los Angeles (1938) James Wrightman, Lone Pine (1950)	15?	13S	36E	MD	Class D, Type 1. Produced over $20,000 in gold-silver between 1901 and 1917. Developed by a 300-foot shaft and 1500 feet of drifts in 1917 by George H. Lewis the operator at that time. Shipped lead-silver ore in 1938 assaying 27 ounces silver, and about 1.5% lead; also gold and copper.
	Black Prince						See: Shoshone. (Tucker 38:469)
	Black Rock	William Adams, et al. Tecopa (1926)		20N	8E	SB	Class D, Type 1. Comprises 6 claims on the north slope of the Nopah Mountains. Galena and lead carbonate in lenses along fissures in dolomite. Developed by 2 adits. No recorded production. (Norman and Stewart 51:170; Tucker 26:478-479; 38:428-429, 469, pl. 3)
	Blake	F. H. Taylor, Big Pine (1919)					Class D, Type 1. Comprises 5 claims in the Big Pine

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Blake (continued)						district, the Black Ann, Black Joe, Holiday, Cleveland, and Grover. Developed by a 30-foot shaft, 170 feet of drifts, and 45 feet of raises. A shipment of ore in 1919 assayed 30% lead, and 14 ounces silver.
	Blue Bell	John C. Cross, Darwin (1922)		11S	36E	MD	Class D. Gold mine located in the Kearsarge district. Produced 1909 to 1922. Some lead recovered in addition to gold-silver.
	Blue Bird						See: Red Eagle
41	Blue Dick	Henry Lang, Tecopa (1913)	18?	20N	8E	SB	Class C, Type 2; 3 claims in the Resting Springs district, the Blue Dick, Legal Tender, and Oversight. Shipped ore 1912 to 1913, and 1915 to 1919 averaging 30% lead, 1.7% zinc, 5.2% copper, and 8.3 ounces silver; also gold. A shipment of copper-silver ore in 1918 assayed 29.2% copper, and 10 ounces of silver per ton. (Eric 48:239; Norman and Stewart 51:170; Sampson 37:264; Tucker 21:283; 26:479; 38:429,469, pl. 3; Waring 19:89)
42	Blue Monster (see also Monster)	R.A. Corey, mgr., Blue Monster Mining Co. Big Pine (1921)	8	14S	38E	MD	Class C, Type 1. Shipped lead-silver ore in 1921 assaying 10.6% lead and 2.68 ounces of silver per ton. A shipment of gold ore also made in 1920.
	Bluff						See: Cerro Gordo. (Tucker 38:469)
	Boushey Silver						See: Cerro Gordo. (Tucker 38:368)
	Brownie	A.J. Sebastion, 6508 Kansas Ave., Los Angeles (1942)		6S	34E	MD	Class D, Type 1. Mine located 9 miles east of Laws in the White Mountains. Galena and lead carbonate bodies along limestone-schist contact. Assays reported 5.95% to 6.55% lead. No record of production. (Norman and Stewart 51:171)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Buckhorn	Andrew Sundberg, Darwin		19S	40E	MD	Class D, Type 1. Silver-lead mine in the Coso district. Developed by a 90-foot shaft. Small shipment of ore made in 1920 by Boaler and Owens of Darwin. Smelter returns showed 46.5% lead and 71 ounces of silver per ton.
43	Bull Domingo	P.N. Johnson, 302 East Anaheim Blvd. Long Beach (1938)	15	6S	35E	MD	Class D, Type 1. Six claims located in the White Mountains. Galena, cerussite, and high silver value reported in fissure at limestone and schist contact. No record of production. (Eric 48:239; Norman and Stewart 51:171; Tucker 34:311; 38:429, 469, pl. 3)
	Bunker Hill	Bunker Hill Min. Co. 689 E Street San Bernardino (1937) Wilson Shannon, R. A. Pierson, Big Pine (1950)		6S	35E	MD	Class D, Type 1. Replacement bodies in limestone. Ore minerals are galena, lead carbonate, and gold. High assays reported. A large silver production recorded between 1891 and 1901. Last recorded shipments were lead-silver ore in 1936 and 1937 assaying 7.9% lead, 6.36 ounces silver, and 0.0446 ounces gold per ton. Mine developed by a 600-foot shaft and a 400-foot tunnel. (Norman and Stewart 51:171; Tucker 21:283; 26:479; 38:426, 429, 469)
	Buster	W.M. Kutch, Bishop (1949); Operator: Grandview Min. Co. Jerril J. Wisdom Big Pine (1949)	appr.	7S	34E	MD	Class D, Type 1. Located in Black Canyon on the west slope of the White Mountains, about 22 miles NE of Big Pine. Sulfide deposit developed by a 40-foot shaft and 30-foot tunnel. A shipment to Selby in 1948-49 assayed 10.4% lead, 6.2 ounces silver, and some copper. Comprises 3 claims, Buster No. 1, 2, and 3.
44	Butte	Tonapah Banking Corp. Beatty, Nevada (1929) J.H. Crook, Beatty, Nevada (1930)	16	15S	41E	MD	Class B, Type 1. Mine located about 51 miles NW of Bonne Claire, Nevada. Oxidized deposit developed by a 600-foot adit. Ore shipped between 1927 and 1930 showed a smelter return of 56% lead, 15 ounces silver, 0.0135 ounces gold, and some copper. A separate shipment of copper ore was made in 1930 also. Smelter recovery on this shipment was 19% copper, 4.77 ounces of silver, and 0.1175 ounces of

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Butte (continued)						gold per ton. (Eric 48:239)
	Camp Bird	J.V. Leigh, Los Angeles (1938)		21S	45E	MD	Class D, Type 2(?). Ten claims in Jacobs Gulch in the Panamint Range; 2 quartz veins with a maximum width of 15 feet, in limestone. Reported to be mineralized with freibergite. Developed by a 400-foot adit and a winze to the 150 level. No recorded production. (Murphy 32:329-356; Norman and Stewart 51:171; Sampson 32:360; Tucker 26:479-480; 38:430,470, pl. 3)
	Carbonate						See: Queen of Sheba
	Cardinal (Rocky Point, Wilshire-Bishop)	Cardinal Gold Min. Co., 927 S. 4th St., Los Angeles (1937) Operator: Jack E. Bright, Bishop (1949)	30	8S	31E	MD	Class D. Gold mine with a large gold production 1911 to 1922 by the Bishop Creek Mining Co. Large gold-silver-copper production with some lead between 1934 and 1939 by Cardinal Gold Mining Co. Operated intermittently to 1949. Free gold and sulfides occur along a fracture zone striking N 55°W, and dipping 60 degrees SW in quartzite and granite. Average width of ore bodies is 8 feet. The mine is developed by a 548-foot incline, a 100-foot vertical shaft, and about 4 miles of drifts and raises. (Eric 48:239; Hamilton 20:34; Norman and Stewart 51:39-40, 146; Tucker 21:281-82; 26:474; 38:10, 389-391, 470, pl. 3; Waring 19:85)
	Cashier (Harrisburgh, Independent)	W.E. Price, Los Angeles (1915) Ambroise Aguereberry Box 10, Trona (1951)	16	18S	45E	MD	Class D. Gold-silver mine. Comprises 7 claims located on Harrisburgh Flat, 5 miles west of Aguereberry Point in the Wild Rose district. Silver, copper, and lead occur with free gold in lens-shaped bodies of quartz in dolomitic limestone near a diorite intrusion. The ore bodies occupy fissures striking N 25°E, and dipping 55 to 70 degrees south. Developed by a 400-foot incline with levels at 100, 200, 300, and 400 feet below the collar of the shaft. Total production over $70,000 in gold-silver,

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Cashier (Harrisburgh, Independent) (continued)						mainly by cyanidation. In 1912, a small shipment of ore by E.L. Goode of Ballarat, assayed 0.266 ounce gold, 151 ounces silver, 0.864% copper, and 3.28% lead. Last operated in 1951 and 1952 when a small tonnage of ore was cyanided. (Eric 48:239; Norman and Stewart 51:44,153; Tucker 26:467; 38:491, pl. 3; Waring 19:75-76)
45	Cerro Gordo (Aries Consolidated, Armagh, Bluff, Boushey Silver, Ignacio, Morman, New Enterprise, Omega, Pagan, Santa Maria, Summit No. 2, Union)	W.C. Rigg and Associates, 595 East Channel Road, Santa Monica (1951)	12,13 23,24 18	16S 16S	38E 39E	MD MD	Class A, Type 1. Comprises 44 patented claims in the Inyo Range about 5 miles north of Keeler at an elevation of 8500 feet. Anglesite, cerussite, argentiferous galena, pyrite, smithsonite, sphalerite, and tetrahedrite occur in Devonian marble along steep, north and northwest fissures. Ore bodies plunge south in the plane of the fissures. The greatest vertical dimension of stopes was about 1000 feet. Developed by a 900-foot shaft with levels at 85, 200, 400, 550, 700, and 900 feet. A 200-foot winze from the 900-foot level north of the shaft extends to the 1000 and 1100-foot levels. A second winze 250 feet deep gave access to a 1030 and 1150 level south of the shaft. Total underground workings have been estimated as great as 30 miles. A large silver-lead production prior to 1877 is not recorded. Between 1911 and 1915 a large tonnage of oxidized zinc ore was recovered from the old silver stopes. Between 1943 and 1945 the Golden Queen Mining Co. shipped between 750 and 1000 tons of ore reported to assay 17.5% lead and 13.2 ounces of silver. In 1946, W.R. Rigg and Associates leased the property which they later bought in 1949. Several thousand feet of underground development and about 1170 feet of diamond drilling were carried out between the 200 and 550 levels in the vicinity of the China stope. Some ore was shipped but the property is now idle. The total production is estimated to be over $17,000,000. Recorded production since 1906 is over $6,000,000. (Chalfant 33:277-283; Crawford

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Cerro Gordo (continued)						94:24-25, 374; DeGroot 90:213-214; Eric 48:239; Goodyear 88:250; Hamilton 20:37; 22:48; Knopf 14:95-109; 18:106-116; Norman and Stewart 51:171, 58-59; Merriam 49:82; Newman 22:420; 23:30; Stewart 49:56; Tucker 21:284; 24:33; 20:185-187; 26:480-482; 34:311; 38:426,431-33, 470, pl. 3; Waring 19:90-92)
	Cerro Gordo **Extension**						See: Royal. (Tucker 38:433)
46	Cerussite	Mrs. Agnes Reid Panamint Springs Lease to: Bill James Lone Pine (1948)	7	16S	40E	MD	Class D, Type 1. Comprises 8 claims on the west slope of Hunter Mountain; 2-inch to 8-inch seam of oxidized lead-silver ore striking north east and dipping 40 degrees north in limestone is developed by 4 short adits. Reported to assay from $12 to $25 per ton. No recorded production. (Norman and Stewart 51:172; Tucker 38:434, 470, pl. 3.)
	Challenge						See: Panamint. (Tucker 38:470)
	Chalmers						See: **Westgard.** (Eric 48:240)
	Chesmac	Donald McDonald, Los Angeles (1938)		20S	45E	MD	Class D, Type 1. Six claims in the Wild Rose mining district on the east slope of Panamint Range. Lead and silver minerals reported in limestone. No recorded production. (Norman and Stewart 51:172; Tucker 26:482; 38:434, 470, pl. 3)
47	Chloride Cliff (Old Mill, Old Mill Schist, McCrea)	Louis McCrea, Beatty, Nevada (1942)	28?	30N	1E	SB	Class D, Type 1. Six claims in the Chloride Cliff district, about 18 miles SW of Beatty, Nevada. Mainly oxidized ore, with free gold associated with galena, and pyrite in quartz veins near limestone-granite contact. Developed by 7 short adits. Small production of gold-silver ore in 1910. **From 1928** to 1942 shipped base ore assaying 6.9% lead and some copper in addition to high gold-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Chloride Cliff (Old Mill, Old Mill Schist, McCrea) (continued)						silver values. Total estimated production over $35,000 mainly in gold-silver. (Ball 06:72-73; Eric 48:240; Norman and Stewart 51:148; Tucker 26:467; 38:391-392, 440, pl. 3; Waring 19:76-77)
48	Christmas Gift	L.D. Skinner, Lone Pine and L.V. Skinner, 247½ N. Virginia St. Reno, Nevada (1951)	11	19S	40E	MD	Class B, Type 1. Five unpatented claims near Darwin. The ore which occurs in stringer in tactite, adjacent to the Darwin stock of granodiorite, is composed of galena, cerussite, anglesite and pyrite. The mine is developed by a 400-foot vertical shaft and 3000 feet of drifts. Produced intermittently from 1894 to 1948, a moderate tonnage of ore showing an average recovery of 0.0334 oz. gold, 47 oz. silver, 29.4% lead, and some copper. (Chalfant 33:132; Crawford 94:24; DeGroot 90:210; Eric 48:240; Goodyear 88:226; Kelley 38:554-555; Knopf 15:10-12; Norman and Stewart 51:172, 59; Tucker 21:284-85; 26:482; 38:434,470,pl. 3; Waring 19:92)
	Cliff	Greenley and Broder Deep Springs (1888)		6S	36E	MD	Class D, Type 1. Rich silver ore reported in quartz veins in granite. No known production. (Goodyear 88:237; Norman and Stewart 51:172; Tucker 21:285; 26:482; 38:434, 470, pl. 3; Waring 19:93)
	Coffin	Leone Noyes, Shoshone (1939)	appr.	22N	1E	SB	Class D. Gold mine located about 35 miles west of Shoshone. Oxidized deposit developed by 3 shafts, the deepest is 140 feet; also a 1200-foot tunnel. Produced 1934 to 1939 small tonnage of gold-silver ore containing some lead. Smelter recovery on ore shipped was 0.79 oz. gold and 0.333 ounces of silver.
	Collegiate	Crowell Mining & Milling Co., 14646 Sherman Way, Van Nuys (1936)	appr.	30N	1E	SB	Class D. Chloride Cliff district. Gold mine developed by shaft. Shipped oxidized ore between 1932 and 1934; smelter return 6.86% lead, and some copper in addition to 1.2 oz. gold, and 3.91 oz. silver per ton. Last worked in

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Collegiate (continued)						1936 when low-grade ore was cyanided.
	Collina	George Probasco, Shoshone (1928)	appr.	21N	7E	SB	Class D, Type 1. Oxidized deposit in the Resting Springs district developed by surface pits. Shipped ore between 1925 and 1928. Smelter recovery was 7.77 oz. silver, 18.38% lead, 12.62% zinc, and some copper. (Eric 48:240)
	Collins	J.J. Collins, Bishop (1918)	appr.	7S	34E	MD	Class D, Type 1. Small shipment of ore in 1918 assaying 0.039 oz. gold, 95 oz. silver, 13.1% lead, and some copper. (Eric 48:240)
	Colorado						See: Zinc Hill. (Norman and Stewart 51:172)
	Columbia						See: Darwin. (Davidson 02:4; Eric 48:240; Kelley 38:561, pl. 7; Knopf 15:17-18; Norman and Stewart 51:172; Tucker 21:285; 26:482-83; 38:435, 470, pl. 3; Waring 19:93)
	Columbia No. 2						See: Shoshone. (Eric 48:240; Sampson 37:268; Tucker 43:120)
	Commetti (Fish Springs Hill)	Le Roi Smith, Big Pine (1941)	7,17, 18	10S	34E	MD	Class D. Gold mine; 2 parallel quartz veins in granite are separated by an andesite dike. Ore contains free gold and sulfides. The property is developed by a 210-foot shaft, and 435-foot tunnel. Produced oxidized ore between 1911 and 1941 intermittently; assay 0.675 oz. gold, 11.2 oz. silver, 0.4% combined lead and copper. A shipment of sulfide ore in 1911 assayed 1.257 oz. gold, 7.12 oz. silver, and 62.8% lead. (Eric 48:240; Norman and Stewart 51:148; Tucker 21:280; 26:408; 38:393, 470, pl. 3)
49	Comstock	Comstock Silver Mining Company	4	21S	45E	MD	Class D, Type 1(?). Reported lead-silver-zinc mine. No known production. (Davidson 02:5; Norman and Stewart 51:173; Tucker 38:470, pl. 3)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	LOCATION T.	LOCATION R.	LOCATION B & M	REMARKS
	Contact No. 7	H. W. Hardy, Beatty, Nevada (1941)	appr.	30N	1E	SB	Class D, Type 1. Oxidized deposit in the Chloride Cliff district; developed by a 120-foot inclined shaft. Shipped lead ore between 1932 and 1936; smelter recovery was 1.47 ounces gold, 4.35 ounces silver, and 8.75% lead. In 1940 and 1941, gold-silver ore was produced and the metals recovered by direct methods.
	Copper Bell						See: Ubehebe. (Eric 48:240)
	Copper Claim						See: Gold Bottom.
50	Copper Queen (Gold Bottom) (Copper Queen, Copper Queen No. 2, Slate Range, American Fraction, Copper Queen Annex, Rosalind Fraction, Mountain Beauty, and Sylvia Fraction)	Gold Bottom Mines Inc. 1611 16th Street, Bakersfield (1938), A.L. Damon, pres., 2215 Poplar Avenue, Sacramento Operator: Louis Warnken Darwin (1951)	31	24S	44E	MD	Class B, Type 2. Six patented claims and others held by location on the west slope of Slate Range, about $7\frac{1}{2}$ miles NE of Trona. Replacement bodies of oxidized lead and zinc sulfides along fissures which parallel the bedding and contact of limestone with slate. Mine is worked by a series of adits totaling over 7500 feet. Produced complex ore between 1917 and 1938. Shipments assayed about 0.208 ounces gold, 10 ounces silver, 0.77% copper, and 9.58% lead. In 1948-49, high zinc ore was shipped. Last operated in 1950 to 1951 when about 100 cars of tailings were shipped. (Eric 48:241, 244, 251; Norman and Stewart 51:70-71; 175; Tucker 26:501; 38:427, 455, 471, pl. 3; 40:10,26)
	Copper Queen No. 2						See: Copper Queen
	Corona group (Gem, Gem-New Discovery, New Discovery and Gem)	August F. Troster, Box 613, Trona (1949) Operator: Gem Mines Inc., Bakersfield (1941); Corona Mining Co., Trona (1949-51)	14	20S	44E	MD	Class D. Gold mine. Three claims located in Jail Canyon in the South Park district. Quartz veins near contact of schist and sheared granite are mineralized with galena, sphalerite, chalcopyrite, bornite, pyrrhotite, and pyrite with associated gold. Developed by a 220-foot shaft, a 42-foot shaft, and several hundred feet of drifts. Small intermittent production 1900 to 1941. Shipped ore to Selby 1948-49 containing recoverable lead, zinc, copper, and

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Corona (continued)						silver in addition to high gold content. Last operated in 1951 and 1952 when small shipments of high-grade gold ore were produced. (Eric 48:243; Murphy 29:114-15; Norman and Stewart 51:40-41, 148; Sampson 32:364; Tucker 38:388,413,476,pl. 3; 40:24)
51	Coso (Coso Copper)	J.O. Lee, Darwin (1917)	24	19S	40E	MD	Class D, Type 2. Copper-lead-silver mine developed by a 175-foot shaft on a 4-foot fissure vein in limestone. Total recorded production about $20,000 from intermittent operations between 1899 and 1938. No record of the lead or zinc produced. The principal value was from gold-silver recovered directly. (Eric 48:241; Kelley 38:560, pl. 8; Tucker 26b:464; 38a:440; Waring 19:72)
	Crescent	Crescent Mining Co. Trona (1924)	appr.	24S	44E	MD	Class D, Type 1. Shipped ore in 1924; smelter recovery 0.085 oz. gold, 5.05 oz. silver, and 6.56% lead.
52	Custer	Long & Grimes, Pasadena (1938)	24	19S	40E	MD	Class D, Type 1. Irregular pods of galena and cerussite with pyrite and iron oxides in a very coarsely crystalline calcite gangue in tactite. Worked on 5 levels from a 335-foot inclined shaft. Recorded production 1919 to 1920. Reported shipment of ore 1940-41. Some copper produced. (Aubury 08:314; Davidson 02:5; Eric 48:241; Kelley 38:560; Knopf 15:15-16; Norman and Stewart 51:173; Tucker 21:285; 26:482-83; 38:426,435,471,pl. 3; Waring 19:93-94)
53	Custer	F.H. Long, Altadena (1940); Dr. Baxter Independence (1949)	28,29	12S	36E	MD	Class D, Type 1. Galena and cerussite with silver and gold values occurs along limestone-granite contact in a 4-6-foot zone. Worked by 2 adits. Recorded production 1893 to 1949 of silver-lead ore with gold, copper, and zinc. Estimated value of ore produced over $20,000. (Eric 48:241; Norman and Stewart 51:173; Tucker 38:435, 470)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Daisy	Hercules Mining Co. Wallace, Idaho (1916)	appr.	12S	37E	MD	Class D, Type 1. Mine located in the Waucoba district on the east flank of Inyo Range about 26 miles SE of Big Pine at 7550 feet elevation. Reached via Saline Valley road. Fissure vein in limestone varying from 6 inches to 2 feet in width, mineralized with coarsely crystalline galena and some cerussite in a quartz gangue. Vein strikes N and dips steeply west and can be traced on the surface for several thousand feet. Shaft sunk 100 feet on the vein; also prospected by several tunnels. No record of production known. (Waring 19:94)
	Daisy LeRoy						See: Bedell. (Norman and Stewart 51:169)
54	Darwin (Bernon, Columbia, Defiance, Driver, Essex, Independence, Lane, Liberty, Lucky Jim, Promontory, Rip Van Winkle, Southwest and Thompson)	Anaconda Copper Mining Co., 25 Broadway, New York City (1953)	11,12 13,14 23,24 25 30	19S 19S	40E 41E	MD MD	Class A, Type 1. Comprises 45 patented claims, 44 unpatented claims, and several millsites. Argentiferous galena, sphalerite, chalcopyrite, tetrahedrite, and pyrite occur in a quartz, calcite, fluorite, hydromica, gypsum, clay, jarosite, jasper, and iron oxide gangue in folded and faulted Paleozoic limestone, dolomite, shale, and quartzite which has been intruded along the east flank of a northwest pitching anticline by the Darwin granodiorite stock. Three types of ore bodies are recognized; replacements of silicated limestone, bedding replacements, and fissure fillings. Production in recent years has been 8000 to 10,000 tons per month reduced to about 20% of its volume by milling and flotation. Mill heads have averaged about 6 ounces of silver, 6.5% lead, 6.4% zinc, and some gold. High-grade oxidized ore is shipped directly to the smelter. The total estimated production before the Anaconda operation began is about $7,000,000. Copper and tungsten have also been produced as a by-product. Ore mined at Darwin around 1880 was oxidized and much higher in lead and silver. Some of the recent stopes at Darwin have been much higher in silver

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Darwin (continued)						than the average. (Davis 48; Chalfant 33:294; Eric 48: 241; Hamilton 20:37; 22:47; Kelley 38:503-62; Knopf 15: 1-18; Newman 23:420; Norman and Stewart 51:59-68, 173-74; Stewart 48:56; Tucker 38:426, 436-37, pl. 3; 41:567-68; 43:118)
	Darwin-Keystone						See: Keystone (Tucker 38:16)
	Death Valley	P.S. Noon, Los Angeles		21N	2E	SB	Class D, Type 1. Mine located 2 miles east of Wingate Pass manganese deposit. Ore reported to assay 13 to 14% lead. No known production. (Norman and Stewart 51:174)
55	Defense	L.D. Foreman, 1354 2nd Ave., Salt Lake City (1953)	28,29	19S	42E	MD	Class B, Type 1. Comprises 3 unpatented claims on east slope of the Argus Range in the Modoc district. Replacement bodies of galena, cerussite and coronadite in limestone along flat faults which nearly coincide with the bedding. Ore bodies are en echelon in the vertical plane and are separated by near vertical faults which may have acted as channel ways for the ore solutions. Tension in the blocks between these vertical faults may have opened the flat shears along which ore has been deposited. Ore bodies are encased in an envelope of jasper, rich in iron and manganese oxides. Heavy manganese-stained limestone marks the outcrop where stopes apex on the surface. Dolomitization of the limestone to a buff color is common in the vicinity of ore, both underground and in the outcrop. The mine is developed by 2 adits used as haulage ways. Intervening ground is developed from winzes from the upper level and raises from the lower level. A D.M.E.A. contract for 2000 feet of diamond drilling in 1952-53 has disclosed the presence of an ore body on the intermediate level. Subsequent development work has proven the ore body to be at least 30 feet by 100 feet by several hundred feet in the greatest dimension. Ore produced between

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Defense (continued)						1942 and 1952 averaged about 21.3% lead, 12.7 oz. silver, 0.146% copper, with some gold and zinc. All ore ran high in manganese and iron. (Eric 48:242; Norman and Stewart 51:68-69, 174)
	Defiance						See: Darwin. Formerly operated by the Darwin Lead Company. (Norman and Stewart 51:174)
	Del Norte	Roy C. Troeger, 4600 Encino Ave., Encino (1951)	13	17S	44E	MD	Class D. Gold associated with minor sulfides in quartz-filled fractures in a gently dipping quartzite intruded by quartz monzonite. Developed by several shallow shafts and several hundred feet of adit. Large tonnage cyanided in the period 1935 to 1943, and in 1948. A small tonnage of concentrates and shipping grade ore contained recoverable lead and copper as well as gold. (Norman and Stewart 51:40, 149; Tucker 38:394-95,471, pl. 3; 40:10, 23)
	Denman	William Denman, Box 674, Big Pine		10S	36E	MD	Class D, Type 1. Argentiferous galena, cerussite and some gold was produced from a deposit near Big Pine in 1950. The mine is developed by 2 shallow shafts, an adit, and open cuts. Shipment assayed 0.0555 oz. gold, 5.73 oz. silver per ton and 5.33% lead. (Norman and Stewart 51:174
	Dennis Jr.						See: Pierson Mining Co. (Norman and Stewart 51:174)
	Domingo Mining Co.	J.H. Simmons, Keeler (1915)	appr.	19S	40E	MD	Class C, Type 1. Shipped silver-lead ore from the Coso district in 1911-13, and in 1915; smelter recovery 28.1 oz. silver, 35.5% lead, and some gold and copper. This ore was probably from one of the mines now incorporated under the Cerro Gordo or Darwin holdings.
	Doodle Bug	W.I. Foster et al. Box 1544, Trona (1952)	appr.	21S	45E	MD	Class D, Type 1. Shipped ore to Selby in 1952 assaying 6.36 oz. silver, 15.15% lead, and some gold.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Driver						See: Darwin. (Davidson 02:5; Tucker 38:471)
	Dunigan	T.C. Dunigan, Covengo (1913)					Class D. Type 1. Shipped lead ore in 1913 assaying 6.5 ounces silver and 37.3% lead. Location of deposit not known.
	Durham						See: Fernando & St. Charles. (Norman and Stewart 51:174)
	Eagle (Westward Eagle)	Frank Nelson, Rt. 1, Box 110, Bishop (1953)	appr.	7S	37E	MD	Class D. Type 1. Located in the Deep Springs district, 5 miles northwest of Westward Pass, 3 miles south of Black Canyon. Produced 1934 to 1949, gold-silver-lead ore with some zinc and copper. Value was mainly in gold-silver. Small shipments in 1949 and in 1951 assayed 4.62% to 10.4% lead with gold and silver and minor zinc.
	Eishesholtz	J. E. Eishesholtz, Independence (1914)					Class D. Type 1. Shipped a small lot of ore to smelter in 1914; smelter assay was 49.2% lead, 64.8 ounces silver and 0.027 ounces gold per ton.
56	Ella	J. Brennan, Keeler (1947) William Betts, Box 452, Clear Lake Highland (1951)	13	16S	38E	MD	Class C. Type 2. Comprises 8 claims in the Cerro Gordo mining district. Ore consists mainly of lead carbonate and galena rich in silver. Zinc, copper, and gold were also recovered. The average assay based on smelter returns was approximately 10% lead, 1% zinc, 1.35% copper, 32 ounces silver, and 0.035 ounces of gold per ton. Ore was shipped between 1910 and 1919. The ore occurred as a replacement in limestone. Developed by 900 feet of adits. (Eric 48:242; Norman and Stewart 51:174; Tucker 26:483; 38:437, 472, pl.3)
	El Toro	James Wrightsman, Lone Pine (1950)	appr.	13S	36E	MD	Class D. Type 1. Ore shipped to Shelby smelter in 1950 from the Independence district contained about 15% lead, and 15 ounces of silver per ton. Only 1 small shipment is known to have been made.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Emigrant	William Ishaael, Death Valley (1940)		29N	1E	SB	Class D, Type 1. Oxidized deposit on Tucki Mt. in the Furnace Creek district; developed by a 100-foot adit. A small shipment of ore in 1940 assayed 33.2% lead and 4 ounces of silver per ton. Three claims are held; the Emigrant No. 1, 2, and 3.
	Empire	J.H. Muffett, Independence (1919)	appr.	10S	37E	MD	Class D, Type 1. A partially oxidized sulfide deposit developed by surface cuts only. Shipments of ore in 1918 and 1919 averaged about 11.6% lead, 8 ounces of silver, with some copper and gold. No recent activity known.
57	Empress	Sam L. Holcomb, 810 Lake Street, Bakersfield (1949) Bond in lease to: Joe McCulley, Box 53 Darwin (1949) Lenn C. Martin Darwin (1951)	2	19S	41E	MD	Class C, Type 2. Mine located on the west slope of Zinc Hill, in the north end of the Argus Range. Comprises 4 unpatented claims. Ore minerals are argentiferous galena and sphalerite with associated oxidation products. Some of the ore contains considerable chalcopyrite. The mine is developed by a 100-foot adit and 200 feet of drifts. Complex ore shipped between 1946 and 1949 showed an average assay of approximately 25.4% lead, 6.95% zinc, 13.9 ounces silver, 1.77% copper, and minor gold. A shipment of ore in 1951 contained 26.4% lead, 3.34% zinc, 6.8 ounces silver, and some copper. (Norman and Stewart 51: 69, 174)
58	Essex (see also Darwin and Big Silver)	Big Silver Mining Co., John D. Fields, 316 Detwiler Bldg., Los Angeles (1928)	31	13S	38E	MD	Class D, Type 1. Shipped silver ore in 1928; smelter recovery was 1.75% lead, 65.6 ounces silver per ton, and some copper and gold. (Davidson 02:5; Davis 48: fig. 2; Eric 48:242; Kelley 33:356-57; Norman and Stewart 51:174)
59	Estelle and Morning Star. (Riff Raff, Sure Contest, Troeger's)	Estelle Mining Corp. Walter Davis, pres. Roy L. Troeger, sec. 4600 Encino Ave., Encino	23, 24, 26	16S	38E	MD	Class A, Type 2. A total of 71 claims on the west slope of the Inyo Range near Keeler. Argentiferous galena in limestone. Developed by 2500 feet of underground workings on 7 levels from a 1100-foot shaft, 8300-foot adit, and 500-foot tunnel. Total workings including old drifts es-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Estelle and Morning Star (continued)						timated to be about 20 miles. Large lead-silver-zinc production, with appreciable copper and gold, between 1916 and 1937. Between 1924 and 1938 production in part was from the Estelle. (Eric 48:242; Knopf 14:110; 18:116-17; Newman 23:421; Norman and Stewart 51:69-70,175; Tucker 21:286; 24:187-89; 26:483-84; 38:437-440, 472, pl. 3, 4; Waring 19:108-09)
	Eureka	Robert L. Franklin, Big Pine (1948)	appr.	9S	34E	MD	Class D, Type 2. Oxidized deposit in the Fish Springs district; developed by a 114-foot shaft, 523-foot tunnel, and 40-foot winze. Small recorded production between 1947 and 1948. Smelter recovery was about 22.7% lead,2.7% copper, and 13.5 ounces of silver per ton.
60	Eureka		31,32	11S	35E	MD	Class D, Type 2. Copper-gold mine. Oxidized copper minerals and galena in quartz vein. Developed by an 80-foot shaft and 100 feet of drifts. No known production. (Eric 48:242)
	Eva Bell	T.K. Andreas, Bishop (1901) McMillan & Harrison Long Beach (1904)	appr.	7S	34E	MD	Class D, Type 1. Produced about 5 carloads of silver-lead-gold ore between 1901 and 1904. Smelter recovery ran about 22 ounces of silver, 2.74% lead, 0.47 ounces gold, and some copper.
	Farrington	A. Farrington, Keeler (1914)	appr.	16S	38E	MD	Class D, Type 1. Shipped silver-lead ore in 1913 and 1914; smelter recovery was about 43% lead, 30.8 ounces silver, and some copper and gold.
	F & H	Fildman & Hyman, Kearsarge (1926)	appr.	13S	36E	MD	Class D. Small shipment of silver-gold ore in 1926; smelter recovered minor lead and copper in addition to silver-gold.
61	Fairbanks	Unknown	11	19S	40E	MD	Class D, Type 1. Comprises 8 claims in Darwin district. Galena and lead carbonate occur along a fissure 2 to 4

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Fairbanks (continued)						feet wide in silicated limestone. No known production. (Kelley 38: pl. 7; Norman and Stewart 51:175; Tucker 38: 440, 472, pl. 3)
62	Fernando & St. Charles (Durham, Fernando, Hayward, St. Charles)	Theodore Peterson, Darwin (1920) C.W. Fletcher, Big Pine (1951)	24	19S	40E	MD	Class D, Type 1. Seven patented claims in the Darwin district. Irregular lenses of galena and lead carbonate occur at a diorite contact in tactite. Scheelite is also reported. The mine is developed by a 150-foot shaft, and 250 feet of drifts. Shipped several carloads of ore in 1919 and 1920. Smelter recovery was 20.8% lead, 29 ounces silver, and 0.067 ounces gold. (Kelley 38:560; Norman and Stewart 51:175; Tucker 26:484; 38:440; 41:570; 43: 118)
	Fish Springs Hill						See: Commetti (Eric 48:243)
	Frazier	Hugh Frazier, Zabriskie (1917)	appr.	20N	8E	SB	Class D, Type 2. Shipped ore and tailings between 1909 and 1916. About 80,000 lbs. of lead and over 28,000 lbs. of copper were recovered in addition to high gold-silver value. Copper ore was shipped in 1917 containing about 3 ounces of silver and 5.35% copper. (Eric 48:243)
	Free & Easy	C.L. Evans, Los Angeles (1934)	appr.	24N	3E	SB	Class D, Type 2. Oxidized deposit in the South Park district. Developed by a 60-foot tunnel. Small shipment of ore in 1934 contained 26% lead, 2.16% copper, 17.8 ounces silver per ton, and about 1 ounce of gold per ton. (Eric 48:243; Norman & Stewart 51:175)
	Four Metals Smelting	A.R. Short, Keeler (1911)	appr.	16S	39E	MD	Class B. Produced between 1908 and 1911 over 1,000,000 pounds of lead, 100,000 ounces of silver, and over 80,000 pounds of copper from Cerro Gordo slags. A 200-ton smelter was erected just east of Keeler and slag was lowered from the mine area via an aerial tram. This proved to be an unprofitable venture. (Eric 48:243, Knopf 14:99)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Franklin D. Roosevelt	J. W. Wrightman, Lone Pine (1935)	appr.	15S	37E	MD	Class D, Type 1. Reported lead-silver claim. (Eric 48:243; Norman and Stewart 51:175)
	Freeze	Ferguson-Johnson et al.	appr.	10S	34E	MD	Class D. Type 1. Shipped about 15 carloads of lead ore in 1934. The smelter recovery was about 2.1% lead, 1.23 ounces silver, 0.191 ounces gold, and recoverable copper. (Eric 48:243)
	Frisco						See: Big Bell (Tucker 38:469, pl. 3)
	Full Moon	C. R. Rider and Carl Mockley, Big Pine (1947)	appr.	9S	34E	MD	Class D. Type 1. Small shipment of ore from the Fish Springs district in 1947. Smelter recovery was 19.65% lead, 2 ounces silver per ton, and recoverable copper.
	Gem (Gem group)						See: Corona group.
	Gift	Skinner Bros., Darwin (1911)					Class D. Type 1. Shipped ore in 1911 assaying 13.5% lead, and 55.5 ounces silver per ton. Possibly this mine is the Christman Gift operated later by the same men.
	Gilbert	J. A. Gilbert Zabriskie (1914)	appr.	21N	7E	SB	Class D. Type 2. A shipment of silver-lead-copper ore in 1914 from the Zabriski district contained 92 ounces silver per ton, 0.85 ounces gold per ton, 3.44% lead, and 1.35% copper.
	Gibralta						See: Hololulu-Big Horn (Eric 48:243)
	Givens	W. A. Givens, Keeler (1911)	appr.	16S	38E	MD	Class C(?). Type 1. Moderate production recorded. Ore contained appreciable gold, silver, and copper as well as lead.
	Gladstone	Charles Brown, Shoshone (1939)	appr.	20N	5E	SB	Class D. Type 2. Mine located 15 miles southwest of Shoshone, in the Carbonate district. Developed by a 200-ft.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Gladstone (continued)						inclined shaft and a tunnel. Shipped some ore in 1939; smelter recovery approximately 0.33 ounces gold per ton, 6.5 ounces silver per ton, 3.58% lead, and 1.2% copper. (Eric 48:243; Norman and Stewart 51:175)
	Gold Belle	Gold Belle Mines Co. Zurich (1935)	appr.	20N	5E	SB	Class D, Type 1. Silver-lead ore shipped to a smelter in 1935 contained 12.7 ounces of silver per ton, 21.4% lead with some gold and copper.
	Gold Bottom						See: Copper Queen
	Gold Bird Lode						See: Granite Contact (Norman and Stewart 51:150)
	Gold Bug						See: Knob (Norman and Stewart 51:145)
	Gold Hill						See: Panamint Treasure. (Norman and Stewart 51:151)
	Gold King	Nathan A. DeRush Olancha (1942) Clarence O. Mittendorf c/o Greer Co., 807 Equitable Bldg., Los Angeles 28 (1951)	appr.	17S	44E	MD	Class D. Gold mine developed by 3 shallow shafts, 30 to 70 feet deep, also 200 feet of drifts. A 6- to 8-foot quartz vein in quartz monzonite, strikes east, dips 15 degrees south. Moderate gold production; mainly by cyanidation. A shipment of high-grade contained 43.5% lead. (Norman and Stewart 51:151; Tucker 40:23)
	Gold Ring	Robert Weir, Brown (1935)	appr.	21S	41E	MD	Class D. Gold mine in the Modoc district developed by a 70-foot vertical shaft and 110 feet of drifts. Shipped high-grade gold-silver ore in 1935 which contained recoverable lead and copper.
	Golden	Fred E. Adams, Los Angeles (1946); Mason E. Franklin, 4599 Pacific Blvd., Los Angeles (1951)	appr.	20S	42E	MD	Class D. Gold mine in the Modoc district. Produced gold by direct recovery between 1935 and 1947. Concentrates shipped contained recoverable copper and lead. Mine developed by 3 adits totaling 220 feet; also 75 feet of drifts. (Eric 48:244; Norman & Stewart 51:151)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Golden Circle	W.R. McCrea, Beatty Nevada (1936) Operator: H.L. Schuefer and W.R. Frieder, Westlead, Nevada (1936)	appr.	30N	1E	SB	Class D. Gold mine located in Chloride Cliff district, 17 miles southwest of Westlead, Nevada. Developed by a shaft and connecting tunnel. Shipped several carloads of gold ore between 1935 and 1936. Besides gold and silver, about 17,000 lbs. of lead was recovered at the smelter; also some copper. (Eric 48:244)
	Golden Star	P. Cartier, Independence (1917)	appr.	13S	37E	MD	Class D, Type 1. A small shipment of lead and silver ore from the Independence district in 1917, assayed 15.4% lead, and 31.2 ounces of silver per ton.
63	Golden Treasure (Ashford)	Harold J. Ashford, Shoshone (1942) or 856 Coronado St., Los Angeles (1951)	3	21N	3E	SB	Class C, Type 2. Comprises 26 unpatented claims on the west slope of Black Mountains. 7 fissure veins in pre-Cambrian granite gneiss are mineralized up to 4 feet in width by free gold, chalcopyrite, chalcocite, bornite, tetrahedrite, and galena. Workings total 4000 feet including a 320-foot shaft. Moderate gold production from ore cyanided. Ore shipped to smelter has averaged 16.8% lead, 0.86% copper, besides gold and silver. (Eric 48:244; Norman and Stewart 51:39,145,152; Tucker 26:469; 38:383; 473, pl. 3; 40:22; Waring 19:78-79)
	Gordon	T.A. Gordon, Keeler (1913)	appr.	16S	38E	MD	Class C, Type 2. Shipped ore from the Keeler district in 1913; smelter recovery was 23.6% lead, 1.25% copper, 29.2 ounces of silver per ton, and 0.033 ounces of gold per ton. (Eric 48:244)
64	Grand View	Charles M. Heron, San Gabriel	1,2, 11,12	19S	41E	MD	Class D, Type 1. Two unpatented claims in the Argus Range near Panamint Springs. Galena and cerussite with some sphalerite, replacing limestone in contact zone with granitic intrusive. Narrow zone reported to assay 12% lead. Abandoned in 1949. (Norman and Stewart 51:72, 175)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Granite Contact (Gold Bird, Gold Bird Lode)	E.O. Graves, 115 East Foothill Blvd., Glendora (1941); Leona M. Gove, 1289½ Queen Ann Place, Los Angeles (1951)	25,30 31	17S 17S	44E 45E	MD MD	Class D. Gold mine developed by an 80-foot shaft and 25-foot drift. Small shipment of gold ore in 1941 contained in addition to gold-silver, recoverable lead and copper. (Eric 48:244; Norman & Stewart 51:150, 152; Tucker 38a: pl. 3)
	Grant						See: Shoshone. (Hamilton 20:37; Hazzard 37:298; Norman and Stewart 51:176; Sampson 33:267; Tucker 21: 291-93; 26:491-92; 38:426,448-50, 477, pl. 3; Waring 19:103-04)
65	Grand View	Panamint Mining Co. (1932)	4	21S	45E	MD	Class D, Type 1. Patented claim near Panamint City. Reported lead-silver-zinc deposit. No known production. (Murphy 32:pl. 5; Norman and Stewart 51:175; Tucker 38: pl. 3.)
	Grandview	D.H. Tobias, 124 De Young Bldg., San Francisco		19S	40E	MD	Class D, Type 1. Lead-silver mine in the Darwin district. No known production. (Norman and Stewart 51:175; Tucker 38:473)
	Great Western	J.J. Williams, Pacific Grove (1907)					Class C, Type 1. Shipped about 2800 tons of lead-zinc ore in 1907; smelter recovery was about 3.05% lead, and 4.16% zinc, with practically no silver.
	Grimes & Sexton	Grimes & Sexton, Trona (1920)	appr.	23S	43E	MD	Class D, Type 1. Lead-silver mine; also gold. No known production. (Eric 48:245)
	Hall	A.B. Hall, Keeler (1918)	appr.	16S	38E	MD	Class D, Type 1. Shipped ore in 1918 containing 13.3% lead, 20.8 ounces silver per ton, and 0.054 ounces of gold per ton.
	Harrisburgh						See: Cashier (Eric 48:245)
	Hawkeye	H.B. Fisher, Beatty	appr.	30N	1E	SB	Class D. Gold mine in the Chloride Cliff district, devel-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hawkeye (continued)	Nevada and J.L. McPherson, 1300-9th Street Antioch (1950)					oped by a 5x7x15 foot shaft in 1941. Gold-silver ore shipped between 1932 and 1950 contained 1.2% lead in addition to gold-silver.
	Hemlock Silver (Silver Peak)						See: Panamint (Davidson 02:6; Murphy 29:86,90, 105-106; Norman and Stewart 51:176; Sampson 32:362; Tucker 25:500; 38:451,473,477,pl. 3)
	Henrietta	J.McCloud, Darwin (1914)	appr.	19S	40E	MD	Class D, Type 1. Shipped ore to the smelter in 1914; smelter recovery was 33.3% lead, 58 ounces of silver, and some copper and gold. (Eric 48:245)
	Homestake	Edith Lockhart and George Koest, Box 75 Darwin	appr. 29, 30	18S	40E	MD	Class D, Type 1. Replacement in dolomite. Worked by a 50-foot and 150-foot shaft with several hundred feet of drifts. No recorded production. (Norman and Stewart 51:176)
66	Honolulu-Big Horn (Gibralta)	John H. Thorndike Trona; Frank Lang 2347 Santa Anita Ave. Altadena (1944)	29 30	22S	45E	MD	Class C, Type 1. Mine located about 35 miles northeast of Trona in the South Park district. Originally located in 1886 as the Gibralta. Replacement bodies in tremolitized, white, fine grained marble contain the ore minerals galena, sphalerite, tetrahedrite, and oxidized lead, zinc, and silver minerals. The ore zone on the surface was from 1 to 4 feet wide striking N85E, and dipping steeply. The mine is developed by 3 adits aggregating 1000 feet. Produced from 1942 to 1944, ore containing an average of approximately 14.6% lead, 23.2% zinc, 3.84 ounces of silver, and recoverable copper. No record of early production is available. (Eric 48:245; Knopf 14:109; Murphy 29:121; Norman and Stewart 51:72,176; Sampson 32:361; Tucker 26:485, 38:440,472,pl. 3; Waring 19:95)
	Hook	B.A. Hook, Darwin (1924)	appr.	19S	40E	MD	Class D, Type 1. Shipped several cars of silver-lead ore in 1924; smelter recovery was approximately 13.9% lead,

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hook (continued)						13.4 ounces of silver, and recoverable copper and gold.
	Hope						See: Black Canyon
67	Hortense	Margaret Wilbur, Darwin (1938)	31	20S	40E	MD	Class D, Type 1. Mine located within the U.S. Naval Ord. Testing Station, Inyokern. No recorded production. (Norman and Stewart 51:176; Tucker 38:473)
	Howard	H.W. Darling, Owenyo (1918)	appr.	14S	36E	MD	Class D. Gold concentrates from ore milled prior to 1918 contained about 15.4% lead and recoverable copper in addition to gold-silver. Main production was in gold, recovered directly.
	Hudson						See: Big Silver. (Norman and Stewart 51:176)
	Hudson River						See: Panamint. (Davidson 02:6; Norman and Stewart 51:176; Tucker 38:473)
	Hughes Lead	H.E. Hughes and M.E. Franklin, Independence (1942)	appr.	13S	36E	MD	Class D, Type 1. Shipped lead ore from the Modoc district in 1941-42 containing about 22.5% lead and recoverable silver, copper, and gold. Also milled gold ore during the same period. Mine is developed by a 135-foot shaft, 200-foot connecting tunnel, and 30 feet of drifts. (Eric 48:245)
	Hunter	W.L. Hunter, Independence (1918)	appr.	13S	36E	MD	Class D, Type 2. Small shipment of complex ore in 1918 from the Independence district showed a smelter recovery of approx. 11.5% lead, 11% copper, 156 ounces of silver per ton, and 0.1 ounces of gold. (Eric 48:245)
	Huntington	F.D. Bailey, Bishop (1913)	appr.	7S	34E	MD	Class D, Type 1. Shipped silver-lead ore in 1913 assaying 53.2% lead, 22.8 ounces silver, 0.2 ounces gold, and recoverable copper. (Eric 48:245)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Ibex (Arcturas)						See: Ibex, San Bernardino County. Formerly described as being in Inyo County.
	Ida						See: Panamint (Davidson 02:6; Norman and Stewart 51:176; Tucker 38:473, pl. 3)
	Ignacio (Ygnacio, St. Ignacio)	Ignacio Mining Co. F.C. Everette, Mgr. Keeler (1917)	appr.	16S	38E	MD	Class D, Type 2. Shipped complex ore between 1914 and 1917 showing a gross metal content of 2.9% lead, 1% copper, 9.35 ounces silver, and 0.024 ounces gold per ton. See also Cerro Gordo. (Norman and Stewart 51:177)
	Inden Lead & Silver Mining Co.	B.S. Edwards, Keeler (1913)	appr.	16S	38E	MD	Class D, Type 1. Ore shipped in 1913 from the Cerro Gordo district showed a smelter recovery of 23% lead, 25.4 ounces silver, and recoverable copper and gold. (Eric 48:245)
	Independence						See: Darwin (Norman and Stewart 51:177) Formerly Wagner Assets Realization Company, Chicago, Illinois
	Independent						See: Cashier. (Norman and Stewart 51:153)
	Index	J.H. Muffett, Zurich (1918)	appr.	9S	34E	MD	Class D, Type 1. Shipped ore from the Big Pine district in 1918; smelter recovery was 14.3% lead, and 0.83 ounces silver per ton.
	Ingomar						See: Western Metals
	Inyo Bunker Hill	Inyo Bunker Hill Co. Big Pine (1920)	appr.	9S	34E	MD	Class D, Type 1. Ore shipped in 1920 contained 46% lead and 24 ounces silver per ton.
	Inyo County Bank	Inyo County Bank (1918)	appr.	9S	34E	MD	Class D, Type 1. Several carloads of ore shipped from Big Pine area in 1918 showed a gross metal content of 20% lead, 70 ounces of silver, and recoverable copper and gold. (Eric 48:245)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Inyo Silver-Lead Smelting Company	Inyo County Bank (1918)	appr.	19S	40E	MD	Class C, Type 1. About 7 carloads of ore were shipped in 1918. Average smelter recovery was 26.2% lead, 28.5 ounces silver, 0.07 ounces gold and 0.98% copper. (Eric 48:245)
	Irwin	J.A. Erwin, Keeler (1909)	appr.	16S	38E	MD	Class D, Type 2. Complex ore shipped to smelter in 1909 contained 38.3% lead, 6% copper, 7.74 ounces silver, and some gold. (Eric 48:246)
68	Jackass	J.J. And George F. Seman, Sonora Avenue Glendale	13,24	19S	40E	MD	Class D, Type 2. Galena, chalcopyrite and pyrite in a bedding-plane replacement deposit in tactite. Developed by a 140-foot incline. No known production. (Davidson 02:6; Kelley 38:560, pl. 7; Norman and Stewart 51:177; Tucker 21:288; 26:487; 38:442,474,pl. 3)
	Jack Baxter						See: Baxter (Eric 48:246)
	Jail Canyon	Gem Mines Inc., Los Angeles (1941)	16	20S	44E	MD	Class D. Gold mine in South Park district. Formerly operated by Panyo Gold Ltd., 639 South Spring St., Los Angeles (1935). Produced 1909, 1910, 1933 to 1935, about 1200 tons of gold-silver ore of moderate grade. About 4000 pounds of copper and 6000 pounds of lead were recovered from concentrates shipped during the last period of operation. See also Corona group. (Eric 48:243)
69	Jumbo	C. Johnson, Independence (1938)	17	17S	39E	MD	Class D, Type 2. Irregular lenses in limestone. Reported to have made shipments in 1915 assaying 8% copper, 15% lead, and 40 ounces of silver. No record of production determined. (Eric 48:246; Norman and Stewart 51:177; Tucker 26:464; 38:pl. 3; Waring 19:73)
	Kane	Belcher Extension Mining Co., Jersey City, New Jersey (1938)		23S	43E	MD	Class D, Type 1. 15 claims on the northeast slope of Slate Range, 12 miles north of Trona at an elevation of 3900 feet. Galena and lead carbonate in parallel fissure

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Kane (continued)						veins 1 to 2 feet wide in limestone. Developed by a 120-foot and a 50-foot shaft and open cuts. (Norman and Stewart 51:177, Tucker 26:487-488, 38:442, 474, pl. 3)
	Keane-Wonder (Vermont)	E. L. Cord, c/o West Coast Improvement Company, 9756 Wilshire Blvd. Beverly Hills (1951)	6 31,32	29N 30N	1E 1E	SB SB	Class D. Gold mine, Chloride Cliff district, 22 miles west of Rhyolite, Nevada. Formerly operated by Keane Wonder Gold Mining Co., Las Vegas (1942). Gold production over $1,000,000. Some ore was shipped directly to smelter, 1919-42. In addition to gold-silver, 4000 lbs. copper , 13,000 lbs. of lead recovered as a byproduct. Concentrates and shipping-grade ore produced another 4,000 lbs. lead, 1950-52. Gold associated with galena, chalcopyrite, and pyrite, in quartz lenses in schist. (Eric 48:246; Norman and Stewart 51:154; Tucker 26:470; 38:402-403, 474, pl. 3; Waring 19:79-81)
70	Keeler (Kruger)	Joe Cook Estate, Keeler (1951)	13	17S	38E	MD	Class C, Type 1. Mine located 5 miles southeast of Keeler. Vein in limestone. Gossan cyanided in 1937 for gold content. The operator, Keeler Gold Mines Inc., Los Angeles, developed the deposit by a 250-foot vertical shaft with a 100-foot winze to the 350-foot level. Drifts total about 400 feet. Mine was worked for lead in 1944 by L. D. Foreman, 850 S. 4th Street W., Salt Lake City, Utah, ore shipped averaged about 3.8% lead, 3.2 ounces silver, and recoverable copper (this probably was tailing). Shipped about 15 carloads of tailings in 1957. Average metal content was about 3.24% lead and 3.48 ounces silver per ton. (Eric 48:246; Norman & Stewart 51:154; Tucker 38:10; 38a:403-404;474, pl. 3; 41:574)
	Kerdell	Gold Hill Dredging Company, 311 California Street, San Francisco		17S	43E	MD	Class D, Type 1. Comprises 12 unpatented claims in the Panamint Mountains. Galena and free gold are reported in replacement lenses along joining planes in limestone. Developed by 2 adits and drifts totaling 300 feet. No

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Kerdell (continued)						known production. (Norman and Stewart 51:73, 177)
	Kesprit	C. Kesprit, Big Pine (1923)	appr.	10S	37E	MD	Class D, Type 1. Shipment of silver-lead ore in 1923 from the Big Pine district contained about 14.7% lead, 12.1 ounces silver, 0.176 ounces gold per ton, and recoverable copper.
71	Keystone (Darwin-Keystone, Silver Button, and Shamrock)	Hilda Bickley, Helen Gunn, and Jess G. Sutleff, Independence. Operators: A.A. Rubel, Peru (1938); Dale Goyn, Darwin (1950)	24 19	19S 19S	40E 41E	MD MD	Class C, Type 1. Oxidized silver-lead deposit in limestone in the Darwin district. Mine developed by a 670-foot adit, 135-foot adit, and about 500 feet of drifts on 2 levels. Produced between 1936 and 1949, ore averaging about 10.5% lead, 10% zinc, 16.8 ounces silver per ton, and recoverable copper and gold. (Eric 48:246; Kelley 38: pl. 7; Norman and Stewart 51:177; Tucker 38:16, 426, 435-36, 471, pl. 3)
	King Henry	William J. Lang Brown (1942)	appr.	24S	47E	MD	Class D. Gold mine developed by a 50-foot shaft. Small gold production in 1942. Small shipment of high-grade gold ore contained about 17.8% lead in addition to gold-silver, and some copper.
	Knob (Anthony, Gold Bug)	S.H. Reynolds, Darwin (1909); Goodluck Mines Inc., Trona (1941) E.A. and O.F. Shafter, Kisk Estates, P.O. Box 1048, Trona (1951)	7	22S	45E	MD	Class D. Comprises 5 unpatented gold claims 3½ miles east of Ballarat in Pleasant Canyon (south side), on the east slope of the Panamint Range. Gold, pyrite, and lead carbonate occur in quartz gangue at intersection of fractures. Country rock is limestone and underlying schist, both highly contorted and fractured by 2 sets of fractures. A shipment of ore in 1909 assayed about 7.5% lead, 4.5 ounces silver per ton,and recoverable copper and gold. Since 1909, the only production has been in gold (between 1930-41). The gold ore was milled and bullion recovered on the property. (Eric 48:238; Murphy 29:121-22; Norman and Stewart 51:45, 155; Sampson 32:368-69; Tucker 38:381, 468, pl. 3)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lane (Last Chance No. 2, Sorba)						See: Darwin
	Last Chance						See: Darwin
	Lead (Hughes)	Mason E. Franklin 4599 Pacific Blvd., Los Angeles (1951)	appr.	19S	42E	MD	Class C, Type 1. Comprises 4 claims adjoining Modoc mine on north. Replacement bodies of lead-silver-gold ore in limestone. Developed by 160-foot vertical shaft with about 200 feet of drifts on 3 levels; also several shallow shafts and a 200-foot tunnel. Ore shipped in the period 1924 to 1927 by E.H. Hughes of Trona averaged about 1.02 ounces gold per ton, 10.9 ounces silver, 28.9% lead, and recoverable copper. (Eric 48:246; Norman and Stewart 51:73, 178)
	Lead Lode	J.W. Ehrman, Big Pine (1930)	appr.	9S	34E	MD	Class C, Type 1. Sulfide deposit developed by a 100-foot adit and raises. Shipped ore between 1927 and 1930; smelter recovery was 40% lead, 23.7 ounces silver per ton and recoverable gold.
	Lead King						See: Lippincott (Norman and Stewart 51:178)
	Lead Queen						See: Royal (Eric 48:247)
72	Leary	Desert Mines, Lone Pine, c/o Mark Leary Olancha (1943); E.P. Aseltine, Box 206, Darwin (1952)	24(?)	16S	37E	MD	Class C, Type 1. Lead-zinc ore body 4 feet wide in limestone (?). Developed by a 150-foot shaft. Produced between 1935 and 1943. Last ore shipped (1952) to Toole smelter assayed approximately 4% lead, 17% zinc, and 4 ounces of silver per ton; also recoverable copper. (Eric 48:247; Norman and Stewart 51:178)
73	Lee (Emigrant, Lee Flat, Silver Reid)	Mrs. Agnes Reid, Panamint Springs (1953) Bond in lease to: Al	24 26	17S •	40E	MD	Class D, Type 1. Six claims in Lee Flat, reached via Saline Valley road. Oxidized silver -zinc-lead-copper ore in limestone along steep-dipping faults and intervening

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lee (continued)	Glenn and Ambroise Aguereberry, Darwin (1953)					flat shears and bedding slips. The primary ore minerals are galena, sphalerite, argentite, tetrahedrite or freibergite(?). Secondary minerals are cerussite, anglesite, smithsonite, hemimorphite, native silver, cerargyrite, azurite, malachite, chrysocolla, and chlorobromides (?) of silver. The largest stopes have been from flat shears opened by tension between steep dipping faults. Ore along steep faults also. Much leaching of the sulfide ore is evidenced by slump breccia and cavernous ground along steep faults. The upper stopes are open to the surface. The deepest level is about 75 feet and is served by a vertical 1-compartment shaft.A series of winzes connect the lowermost stopes with the upper workings and the surface. The mine produced in 1920, 1936-37, and 1951 to 1953. Hand-picked ore shipped since 1951 has averaged about 67.5 ounces of silver, 1.8% lead, 19% zinc, and recoverable gold and copper. (Burchard 84:163; Eric 48: 247; Norman and Stewart 51:179; Tucker 21:289; 26:488; 38:443, 475, pl. 3; Waring 19:99-100)
74	LeMoigne (LaMoine, Le Moyne)	Mrs. Ruth Hunter, Box 26, Olancha Operator: W.V. Skinner Lone Pine (1953)	36	16S 17S	44E 43E	MD MD	Class C, Type 1. Mine located 15 miles southwest of Stovepipe Wells on the east flank of the Panamint Range. Comprises 12 claims. Massive galena and lead carbonate occur in irregular lenses along steep dipping faults in limestone beneath a thrust plate. Developed by adit and shaft. Estimated underground workings 1500 feet. Produced in 1925, 1927, 1947, and 1951-53. Average metal content of ore shipped since 1925 has been 0.28 ounce of gold, 3.76 ounces silver, 28% lead, and recoverable copper. (Norman and Stewart 51:178; Tucker 26:488; 38:443,475, pl. 3)
	LeRoy						See: Bedell (Newman 23:421)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lestro	Charles Brown, Shoshone (1933)	appr.	20N	5E	SB	Class D. Milled small tonnage of gold ore in 1933; also shipped high grade containing about 11% lead and recoverable copper in addition to gold-silver. (Eric 48:247)
	Liberty						See: Darwin (Norman and Stewart 51:178; Tucker 38:475)
	Lilly	Ray Argo, 11837 South Loma Dr., Whittier (1952)	appr.	24S	43E	MD	Class D, Type 1. Three claims, Lilly No. 1, 2, and 3; located about 3 miles north of Valley Wells in the Slate Range district. Developed by a 40-foot, 35-degree inclined shaft. A small shipment of ore milled at Randsburg and reduced to 25% of its volume showed a recoverable metal content at the smelter of 4.44% lead, 5.5 ounces of silver, and recoverable zinc, copper, and gold (per ton of raw ore).
	Lincoln (Silver Dome)	A.T. Wilkerson, Bishop (1938)		6S	37E	MD	Class D, Type 1. Six claims in the Deep Springs district. Narrow fissure veins in granite reported to be high in silver. No known production. (Norman and Stewart 51:178; Tucker 21:289; 26:488-89; 38:443-44, 475, pl. 3)
75	Lippincott (Lead King)	George Lippincott P O. Box 1811, Santa Ana (1953)	13	15S	40E	MD	Class C, Type 1. Comprises 12 unpatented claims 4 miles south of Ubehebe Peak, about 4 miles west of the Racetrack. Ore of lead, zinc and silver in siliceous pipes and replacement pods in limestone adjacent to quartz monzonite stock. Development consists of a 125-foot inclined shaft, a 435-foot, and a 100-foot tunnel, and open cuts. Produced between 1940-49, and 1950-52. The ore which in recent years has averaged about 18% lead and 7.5 ounces of silver per ton in addition to zinc has been smelted at the Lippincott smelter in Santa Ana. Some ore was smelted at Tooele. The last ore shipped contained about 7.5% zinc in addition to lead-silver. (McAllister 49; Norman and Stewart 51:74, 179)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
76	Little Chief	Panamint Mining Company (1932)	10 15	21S	45E	MD	Class D, Type 1. Lead-zinc mine. No known production. (Davidson 02:6; Murphy 32: pl. 5; Norman and Stewart 51: 179; Tucker 38:475, pl. 3)
	Little Mack	Otto Seidentopf, Trona (1951)	34	19S	42E	MD	Class D. Gold mine located in the Modoc district adjacent to the Minnietta. A series of parallel quartz veins along bedding planes in limestone; strike N 20 E and dip 50 S. The veins which are 2 to 4 feet wide are mineralized with gold associated with lead carbonate. Worked by 2 adits, 250 feet and 20 feet in length; also an 80-foot winze. (Norman and Stewart 51:155; Tucker 38:405-06,475, pl. 3)
77	Long John	Long John Mining Co., Lone Pine (1939) James A. Walker, 1201 N. Isabel St., Glendale (1951)	16, 21	15S	37E	MD	Class D, Type 1. Seven patented claims on west slope of the Inyo Range. Galena and lead carbonate with silver in fissures in limestone. Ore shipped in 1939 contained 5.94% lead, 8.84 ounces of silver, 0.77% copper and some gold. (Eric 48:247; Norman and Stewart 51:179; Tucker 38: 444, 475, pl. 3; 40:10,26)
	Lookout No. 1	John Wiggington Keeler (1919)	appr.	16S	39E	MD	Class D, Type 2. Complex sulfide body developed by 25-foot shaft, 40-foot connecting tunnel, 15-foot winze, and open cuts. Small shipment of ore in 1919 contained 30% lead, 1.11% copper, 28 ounces of silver, and 0.02 ounce of gold per ton. (Eric 48:247)
	Lost Frenchman	D. Hansen, Keeler (1911)	appr.	16S	38E	MD	Class D, Type 2. Made a small shipment of ore in 1911, containing 31.6% lead, 2.15% copper, 28.5 ounces of silver, and 0.127 ounce of gold per ton. (Eric 48:247)
	Lost Hope	A.L. Wilkerson, Big Pine (1923)	appr.	11S	33E	MD	Class D, Type 1. Located in Pine Mountain, 30 miles southwest of Big Pine. Developed by an 80-foot vertical shaft, 50-foot connecting tunnel and 50 feet of drifts. A small shipment of ore was made in 1923; smelter recovery was 21% lead, and 5.5 ounces of silver per ton.

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MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lucky Buck	John W. Johnston, Box 4, Trona (1951)	appr.	17S	44E	MD	Class D. Type 1. A small lot of ore was shipped from the Wild Rose district to Mojave to be milled in 1951. Concentrates went to Selby smelter. Recoverable metal per gross ton of ore was 13% lead and 7.85 ounces of silver.
	Lucky Dog	George H. Lewis, San Diego (1940) Operator: H. T. Wilson Keeler (1940)	appr.	16S	38E	MD	Class D. Type 2. Small shipment of ore mined during performance of assessment work in 1940. Smelter recovery 22.4% lead, 9.8% copper, and 8.26 ounces of silver per ton. (Eric 48:247)
	Lucky Hike Prospect	Lloyd and F. M. Bedell, Big Pine	appr.	8S	39E	MD	Class D. Type 1. Located in the Waucoba district, 28 miles east of Big Pine at an elevation of 7060 feet. Galena reported in quartz outcrops along top of low hogbacks. Country rock is shattered slate and schist. Prospected by an adit. No known production.
	Lucky Jim						See: Darwin (Norman and Stewart 51:179). Mine located about 2 miles north of Darwin. Owned by Wagner Estates Corp., Chicago, Illinois (1922) and operated by American Metals Inc., c/o H.E. Olund, Darwin. Irregular lenses of lead carbonate and galena in fissures in limestone near monzonite intrusion. Developed by a 300-foot vertical shaft with a winze to the 750-foot level. Production estimated about $2,000,000. Operated between 1903 and 1919 by Darwin Silver Company. Now included in Darwin holding. (Chalfant 33:294; Crawford 94:24; Davidson 02:6; DeGroot 90:211-212;Eric 48:247; Goodyear 88:226; Kelley 38:554; pl. 7; Knopf 15:12-13; Norman and Stewart 51:179; Tucker 21:289-90; 20:189; 26:483, 488-89; 38:426, 444-475; Waring 19:100-101)
	Lucky Strike	B. J. Owen, Ballaret, (1912)	appr.	22S	45E	MD	Class D. Type 1. Shipments of ore in 1912 from the Ballarat district contained 3.57% lead, 7.86 ounces of silver, and 0.092 ounce of gold per ton. Some high-grade gold ore was milled and gold recovered directly.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lucky Strike	F.D. James, Lone Pine (1951)	appr.	16S	38E	MD	Class D, Type 1. Shipped a small lot of ore in 1951; smelter recovery was 19.6% lead, and 4 ounces of silver per ton.
	MacLean	John MacLean, Los Angeles (1938)	appr.	10S	37E	MD	Class D, Type 1. Mine located in the Ubehebe district, 45 miles southeast of Big Pine. Development consists of vertical shaft, drifts, and tunnels. Shipment of ore in 1938 contained about 26.8% lead, 17.6 ounces of silver and some gold.
	Mabel						See: Shoshone (Tucker 38:475)
	Madison	J.P. Madison, Trona (1936)	appr.	21S	45E	MD	Class D, Type 1(?). Lead-silver-gold prospect; also copper. No known production. (Eric 48:247)
78	Mary Darleen	Mary Darleen Mines, Independence (1947)	23, 24, 25	13S	33E	MD	Class D, Type 1. Silver mine developed in 1947 by 300 feet of drifts and crosscuts. Small shipment of ore in 1947 contained 0.33 ounce of gold and 58.4 ounces of silver per ton with recoverable lead and copper.
79	Mayflower	Stewart & Lolly, Darwin (1923)	14	16S	38E	MD	Class D, Type 1. Mine developed by a 40-foot shaft and tunnels. Smelter recovery from a small shipment in 1923 was about 22.5% lead, 46 ounces of silver, and recoverable copper. (Eric 48:247; Tucker 38a:476)
	McCabe	P. McCabe, Tecopa (1918)	appr.	20N	8E	SB	Class D, Type 1. Ore shipped from the Tecopa district in 1918 contained 18.9% lead, 14.6 ounces of silver per ton, and recoverable copper and gold. (Eric 48:247)
	McCrea	Wilkinson & McCrea, Beatty, Nevada (1929)	appr.	30N	1E	SB	Class D. High-grade gold-silver ore shipped to smelter in 1929 contained in addition to gold-silver, 7.12% lead and recoverable copper. (Eric 48:247; Norman and Stewart 51:157)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
80	March Storm	Western Lead Mines Company, Los Angeles (1926)	33,34 10,11	12S 13S	45E 45E	MD MD	Class D. Type 1. Argentiferous galena disseminated and in lenses along bedding planes in limestone. Developed by short adits. No recorded production.
	Marvel						See: Panamint. (Norman and Stewart 51:179)
	McDonald	John McDonald, Keeler, (1918)	appr.	16S	39E	MD	Class D. Type 2. Located in the Cerro Gordo district. Ore shipped in 1918 showed a smelter recovery of 23.4% lead, 2.85% copper and 37.6 ounces of silver per ton. (Eric 48:247)
81	Mexican (Reed Flat)	Jim Burcham & Frank Watkins, Bishop; and H.M. Brocor, Big Pine (1948)	6	7S	35E	MD	Class D. Type 1. Six unpatented claims on the west slope of the White Mountains. Replacement of galena and sphalerite in limestone. Ore is partially oxidized to carbonates of lead and zinc. Assays made in 1948 showed up to 3.7% lead, 6% zinc, and 2.6 ounces of silver per ton. Production now known. (Norman and Stewart 51:74, 179; Tucker 26:497; 38:452, 478, pl. 3)
	Midnight	Ed Grimshaw, Pat McLaughlin, and Frank McQueary, Tecopa (1951)	appr.	20N	8E	MD	Class D. Type 1. Comprises 4 claims in the Kingston Range. Lenticular masses of lead carbonate occur along a fissure in limestone. Developed by adits. No recorded production. May be same as Blue Dick, which see: (Tucker 38:429)
82	Mineral Hill (Swank)	Robert W. Swank, et al., Big Pine (1938)	29	8S	36E	MD	Class D. Type 1. Eleven claims on the east slope of White Mts. Irregular lenses of galena and cerussite in a series of parallel veins in tactite. Developed by adits. Small shipment of ore in 1913; smelter recovery was

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mineral Hill (Swank) (continued)						40% lead, 41.8 ounces of silver per ton; and recoverable copper. (Eric 48:252; Norman & Stewart 51:180; Tucker 26:489; 38:444,476, pl. 3)
	Mineral Point (Sanger)						See: Black Canyon (Norman and Stewart 51:180)
83	Minnietta (Minneatta, St. John)	Mrs. Jack Gunn, Independence (1953). Operators: Ross Finely & Tom Vignich, Panamint Springs (1948-52)	33, 34	19S	42E	MD	Class B, Type 1. Five claims and millsite on the east slope of the Argus Range in the Modoc district. Argentiferous galena and sphalerite with their oxidation products occur in limestone along the sole of a thrust sheet and in steeply dipping faults below the thrust. Silicification and the introduction of manganese and iron oxides accompany the ore and mark the outcrops. Diabase dikes are in close proximity to some stopes and may have controlled deposition of ore. A large lead production is recorded for the years 1902 to 1949. From 1948 to 1952 zinc as well as lead was recovered. The last ore shipped in 1952 continued 12.1% lead, 8.2 ounces of silver, and recoverable copper and gold. Zinc production has not been large; about 12,000 pounds (1948, 1950). In 1952 and 1953 American Smelting and Refining took a lease on the property. Development work was contracted by McFarland & Hullinger, (23 Pinehurst Avenue, Tooele, Utah) to sink a shaft just north of the recent workings in an attempt to find a continuation of the thrust. The shaft bottomed in alluvium proving the thrust was lost by erosion at this point. American Smelting and Refining has subsequently dropped the lease. (Davidson 02:8; DeGroot 90:212; Eric 48:248; Norman and Stewart 51:75,180; Tucker 21:200; 26:490; 38:426-27,445,476, fig. 9, pl. 3; Waring 19:101)
	Mistake	John P. Compton, Laws (1926)	appr.	7S	34E	MD	Class D, Type 1. Located in the White Mountains, 8 miles southeast of Laws. Sulfide deposit developed by a 30-foot shaft, and a 60-foot tunnel. Shipped ore in 1925 and

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mistake (continued)						1926; smelter recovery was 39.3% lead, 12.5 ounces of silver per ton, and 0.64% copper. (Eric 48:248)
	Modina-Rogers	Modina & Rogers, Death Valley (1909)					Class D. Type 1. Ore shipped in 1909 contained 24.7% lead, 88 ounces of silver per ton and some gold.
84	Modoc (Modock)	Hearst Estate, San Francisco Operators: L. J. Bacoccina and L. D. Foreman, Darwin (1947)	27,28	19S	42E	MD	Class B. Type 1. Five patented claims and 3 unpatented claims on the east slope of the Argus Range in the Modoc district. Ore is argentiferous galena, lead carbonate, and gold in fissures in limestone adjacent to diabase dikes and sills. Production up to 1890 is estimated to be $1,900,000 from ore running 30 to 50% lead, 50 to 200 ounces of silver, and 0.25 ounce of gold per ton. Since 1944, 15,000 tons of dump materials has been shipped. Assays ran 2.37% to 11.07% lead, 4 to 10% zinc, 0.45 to 12.83 ounces of silver, and 0.03 to 0.12 ounce of gold per ton. (Burchard 84:164; 85:104; Crawford 94:24; 96:32; Davidson 02:7,11; Eric 48:248; Norman and Stewart 51: 75, 180; Tucker 21: 290; 26:490; 38: 426-427, 445, 446, 447, fig. 9, pl. 3; Waring 19:101)
85	Monster	J. P. Fitting, Big Pine Dr. John MacLean Estate 412 East Manchester Avenue, Inglewood (1916)	8	14S	38E	MD	Class C. Type 1. Six claims on the east slope of the Inyo Range. Irregular lenses of galena in brecciated limestone. Produced between 1908 and 1921. Over 9000 pounds of copper were recovered as a by-product. See also Blue Monster. (Eric 48:248; Knopf 14:111; 18: 117-118; Norman and Stewart 51:180; Tucker 21:290; 26:490; 38:426, 447, 476, pl. 3; Waring 19:101)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
86	Monte Carlo (Mt. Whitney Union)	J. M. Johnson, 1505 North Niagara, Burbank (1937) Keeler Gold Mines Inc., Los Angeles (1939)	14	14S	36E	MD	Class C. Type 1. Seven claims on the west slope of the Inyo Range in the Cerro Gordo district. Quartz veins 6 to 20 feet wide, striking N 70° E and dipping 60° W are mineralized with argentiferous galena and cerussite. Country rock is limestone and calcareous slate. Developed by 8 adits totaling about 3000 feet. A recorded production of over 100,000 ounces of silver prior to 1902 The 1902-05 production was from the union. Between 1936 and 1939 the Monte Carlo produced a moderate tonnage of silver-lead-gold-copper ore. (Davidson 02:8; Eric 48:239, 248, 252; Norman and Stewart 51:180; Tucker 26:501-503; 34:311; 38:457, 469, 476, 479; Waring 19:84)
87	Montezuma	Stuart Bedell, Big Pine (1943) Operator: Eugene Craft, Big Pine (1943) Lessee: Hugh Higham, Big Pine (1951)	7	10S	35E	MD	Class B, Type 1. Six claims on the west slope of the Inyo Range, about 10 miles southeast of Big Pine. Argentiferous galena, sphalerite, and lead and zinc carbonates in lenses along a fault between limestone and clay slates. The mine is developed by a 405-foot adit and open cuts. A large recorded production between 1899 and 1943 of ore averaging approximately 8.58% lead, 10.3 ounces of silver, 0.25% zinc, 0.20% copper, and 0.092 ounce of gold per ton. (Burchard 84:158; Crawford 96:32-33; Eric 48:248; Knopf 14:109-110; 18:116; Norman and Stewart 51:180; Tucker 21:291; 26:491; 38:426, 447, 476, pl. 3; Waring 19:101)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Moonlight	Henry V. Pleikas, Trona (1923)	appr.	19S	45E	MD	Class D. Type 2. Located in the Wild Rose district. Mine developed by a 20-foot vertical shaft and 200-foot connecting tunnel. One small shipment of ore in 1923 showed a recoverable metal content, at the smelter, of approximately 7.6% lead, 2.6% copper, 165 ounces of silver and 0.09 ounce of gold per ton.
	Morman						See: Cerro Gordo. (Tucker 38:476)
88	Morning Glory	H. P. Gower, 510 West Sixth Street, Los Angeles, (1950) Operators: Morning Glory Mining Company, 201 South Irving Blvd., Los Angeles 4, (1951)	2 (?)	19S	45E	MD	Class D. Type 2. Four claims in the Wild Rose district about 2 miles south of the Old Dependable mine, and antimony prospect. A 6-inch to 4-foot quartz vein in shale is mineralized with auriferous and argentiferous complex sulfides. Small shipments of ore were made in 1935, 1939, and 1951. The average smelter recovery was about 2.39% lead, 4.2% copper, 29.6 ounces of silver, and 0.05 ounce of gold per ton. (Norman and Stewart 51:181)
	Morning Star						See: Estelle. (Eric 48:248; Norman and Stewart 51:181; Tucker 20:188-189; 26:484; 38:439-440, pls. 3,4)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mountain Girl	H.L. Porter, Ballarat (1912). H.C. Porter Trona (1942)	1	22S	45E	MD	Class D. Gold mine located in the South Park district. Several small quartz veins in schist are mineralized with coarse free gold associated with argentiferous galena. A shipment of silver-lead ore in 1912 assayed 2.25% lead and 14.0 ounces of silver per ton. The last known operation was between 1938 and 1942 when a small tonnage of ore was milled and gold-silver recovered directly. (Norman and Stewart 51:158; Sampson 32:370-71)
89	Mountain View	Broachman & Haws, Gibbons (1913) Pritchett & Slater Independence (1948)	34	13S	37E	MD	Class D, Type 1. A small shipment of ore was made in 1948 smelter recovery was 32% lead, and 1.0 ounce of silver per ton. (Eric 48:248; Norman and Stewart 51:158; Tucker 38a: pl. 3)
	Mt. Whitney	Spear Brothers, Lone Pine (1908). R.C. Spear, Lone Pine (1922)	14	14S	36E	MD	Class D. Shipped high grade gold-silver ore in 1908 and in 1922. In addition to gold-silver, the ore contained about 4.68% copper and 7.68% lead. See also Monte Carlo. (Norman and Stewart 51:181)
	Nancy Hanks	William Denman & E. Carlson, Big Pine (1949)	appr.	10S	37E	MD	Class D, Type 1. Located 21 miles southeast of Big Pine, in the Inyo Range. Property developed in 1949 by 150 feet of drifting. Recoverable metal in a shipment to Selby during that year was 25.8% lead, 8.65 ounces of silver per ton, and recoverable copper.
	Nellie H.	A.M. Strauss, Lone Pine (1919)	appr.	15S	37E	MD	Class D. Small shipment of high grade gold ore in 1913 contained about 1% combined copper and lead in addition to high gold-silver. Between 1914 and 1919, about 71 tons of high grade gold ore was milled and gold-silver recovered directly. (Eric 48:248)
	New Deal	Lead Canyon Mining Co., Pacific Palisades (1941)		23S	44E	MD	Class D, Type 1. Small shipment of silver-lead ore in 1940-41 containing 23.6% lead, 28.6 ounces of silver per ton, and recoverable copper. Last operated in 1948 when

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	New Deal (continued)	Wise & Sharry (1948)					a small tonnage of gold ore was milled. (Norman and Stewart 51:181)
	New Cosomo	L.L. Brackitt, Darwin (1914)	appr.	19S	40E	MD	Class D, Type 1. Shipped several carloads of ore in 1914; smelter recovery was 36.4% lead, 68.6 ounces of silver per ton, and recoverable gold and copper. (Eric 48:248)
	New Discovery (Gem, Gem Group, Gem-New Discovery)						See: Corona
	New Enterprise	Thomas Henning, Darwin		16S	38E	MD	Class D, Type 1. Lead-silver-zinc prospect. No recorded production. (Davidson 02:7; Norman and Stewart 51:181; Tucker 38:477, pl. 3)
90	Newsboy	Newsboy Mining Co., Keeler (1913) Cerro Gordo Mining Co. Keeler (1918)	19	16S	39E	MD	Class D, Type 2. Galena, cerussite and bindheimite with associated gold and silver, occurs in quartz veins in limestone. Worked by adit. Ore shipped in 1913 showed a smelter recovery of 17.1% lead, 3.12% copper, 74.5 ounces of silver, and 0.5 ounce of gold per ton. (Eric 48:249; Knopf 18:117; Norman and Stewart 51:181)
	New Sutherland Divide						See: Queen of Sheba
	Noonday						See: Shoshone (Eric 48:245,249; Hamilton 20:37; Hazzard 37:298; Norman and Stewart 51:181; Sampson 37:267; Tucker 21:291-93; 26:491-92; 38:426, 448-50,477, pl. 3; 43:120; Waring 19:103-104)
91	Nopah	J.P. Madison, Shoshone	5	23N	8E	SB	Class D, Type 1. Four claims at the north end of Nopah Range. Lead and zinc minerals occur in a breccia pipe along a fault in dolomitic limestone. Reported production of 3 carloads of ore averaging 30% lead and 17 ounces of silver; also 2 carloads of zinc ore averaging 30% zinc. The mine is developed by an 80-foot, 80-degree inclined

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Nopah (continued)						shaft and connecting tunnel. (Norman and Stewart 51:76-77, 181)
	North Star	D.E. Boelter, et al. Los Angeles (1938)		15S	38E	MD	Class D, Type 2(?). Seven claims on the east slope of the Inyo Range. Galena, pyrite, chalcopyrite with gold and silver in quartz veins in granite. Developed by open cuts and a shallow shaft. No recorded production. (Norman and Stewart 51:181; Tucker 38:413, 477, pl. 3)
	North Star	Nielson & Abrahamson Arcadia (1940)	appr.	21N	4E	SB	Class D, Type 1. Silver-lead-gold mine in the Confidence district; developed by a 70-foot shaft and 80-foot connecting tunnel. Produced gold and silver between 1895-97 from ore milled. Estimated value $4,000. Several shipments of silver-lead ore were made in 1926-27; smelter recovery was 22.5% lead, 11.4 ounces of silver, and some gold. Last operated in 1939-40 when a small tonnage of ore was milled and gold-silver recovered directly.
	O.B.J.						See: Tyler-Oster-Thurman group.
	Old Gold	Old Gold Mines Company Trona (1941)	appr.	22S	45E	MD	Class D, Type 1. Reported lead-silver-zinc prospect. No known production. (Eric 48:249; Norman and Stewart 51:182)
	Old Mill						See: Chloride Cliff. (Eric 48:249)
	Old Mill	Buckhorn Humboldt (1926)	appr.	16S	44E	MD	Class D, Type 1. Shipped several cars of ore from the LeMoigne district in 1926; smelter recovery 39.4% lead, 5.62 ounces of silver, 0.629 ounce of gold per ton, and recoverable copper.
92	Old Timer	Charles Meyson, E.F. Fitzgerald, Lone Pine and Julia Overgard,	29	17S	39E	MD	Class D, Type 1. Six claims near Keeler, in the Cerro Gordo district. Argentiferous galena and cerussite in a series of quartz stringers in slate. Developed by a 140-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Old Timer (continued)	Oakland Operator: C. W. James, Lone Pine (1948)					foot adit, 60-foot winze, and 160 feet of drifts. Shipped several cars of ore in 1947-48; smelter recovery was 8.5% lead, 9.1% zinc, 6.3 ounces of silver per ton, and recoverable copper. (Norman and Stewart 51:77, 182)
	Omega						See: Cerro Gordo. (Tucker 38:477)
	Opal	Walter Bird and Russel Stewart, Big Pine (1916)	appr.	10S	37E	MD	Class D. Type 1. Mine located in the Waucoba district, 26 miles southeast of Bishop at an elevation of 7650 feet. Adjoins the Daisy or Bedell. Two parallel veins in limestone, about 100 feet apart. Strike N 20°W, dip 30°N. Zones up to 18 inches wide are mineralized with galena. Developed by 4 shallow shafts; the deepest is 50 feet. (Tucker 26:492; Waring 19:104)
93	Ophir (Uncle Sam)	Gold Bottom Mines Inc. A.L. Damon, Pres., 2215 Poplar Avenue, Sacramento (1951) Engineers Exploration Co., Drawer D, Red Mt., (1952) Operator: Ned E. Raymond, Box 1071, Trona (1952)	24	24S	43E	MD	Class B. Type 1. Two patented and 13 unpatented claims on the west slope of Slate Range. Galena, lead carbonate, and lead vanadate occur in a fissure zone in limestone. Mine developed by a 540-foot vertical shaft. Recorded production between 1915 and 1949 of over $500,000, mainly from lead. Reported production of 50 tons per week in 1943 of ore assaying 20% lead, 4% zinc, and 40 ounces of silver. The over all silver average was probably less than 5 ounces per ton. During 1950 and 1952 several cars of dump material were shipped to Tooele. Smelter recovery was about 18.5% lead, 8.85% zinc, 3.5 ounces of silver per ton, and some gold. (Eric 48:249; Norman and Stewart 51:77, 182; Tucker 26:492-493; 38:427,450,459, pl. 3; 40:10)
	Ore Gulch	A. A. & John Chambers, Tecopa (1916)	appr.	20N	8E	SB	Class D. Type 1. Mine located in the Resting Springs district. Shipped about 6 carloads of ore in 1916: smelter recovery was 12.7% lead, 2.4% zinc, and 10.7 ounces of silver per ton.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Orion						See: Panamint
	Oro Fino						See: Shoshone (Norman and Stewart 51:182, Tucker 38:477, pl. 3)
	Oversight	J.P. Madison, Ludlow (1928)	appr.	22S	47E	MD	Class D, Type 1. Mine located in the Carbonate district. Developed by an 80-foot shaft. Several cars of ore were shipped between 1919 and 1928; average recovery at the smelter was 30.4% lead, 0.72% copper, 15.6 ounces of silver, and 0.10 ounce of gold per ton. (Eric 48:249)
	O.B. Joyful						See: Tyler-Oster-Thurman group.
	Old Coso	C.R. Townsend, Keeler (1910)	appr.	20S	40E	MD	Class D, Type 2. Mine now within the boundaries of the U.S. Naval Ord. Testing Station, Inyokern. Small shipment of ore in 1910 showed a smelter recovery of approximately 35% lead, 8.1% copper, 52 ounces of silver, and 0.29 ounce of gold per ton. (Eric 48:249; Norman and Stewart 51:182)
94	Paddy's Pride	Lowell V. Crawford, Shoshone (1952) Operator: Joseph W. Cook Tecopa (1952)	 13(?)	20N 21N	5E 5E	SB SB	Class C, Type 2. Five claims at the southern end of the Amargosa Range, 9 miles west of Zabriskie. Vein of lead carbonate in limestone; maximum width 8 feet. Developed by 700 feet of adits, crosscuts and raises. Recorded production from 1921 to 1923 (Patrick Miles, Shoshone, operator) and 1951 to 1952. Small shipments made during the latest period of operation have averaged about 15.5% lead and 10 ounces of silver. The last shipment made also contained 7% zinc and 1% copper, and some gold, in addition to lead-silver. (Eric 48:249; Newman 23:611; Norman and Stewart 51:182; Tucker 21:293; 26:493-94; 38:450-51, 477, pl. 3)
	Pagan						See: Cerro Gordo (Tucker 38:477)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Paloma	Frank Barber, Tecopa (1923)	appr.	20N	8E	SB	Class D, Type 1. Lead-silver mine; also gold. Production unknown. (Eric 48:249)
	Panamint	Fred Gray, Trona (1940) Operator: D.D. DeMasters, Lancaster (1940)		19S	44E	MD	Class D. Silver-gold mine in the Modoc district. Small production in 1913, 1933-34, and in 1940. Some lead and copper recovered as a by-product. (Eric 48:249; Norman and Stewart 51:182)
95	Panamint Mines	Hedvig Meyers, 6827 Hayward St., Tujunga (1951)	10,11, 15,21, 22	21S	45E	MD	Class D, Type 1. Eleven patented and 7 unpatented claims in Surprise Canyon on the west slope of the Panamint Mountains. Claims include Alabama, Challenge, Comstock, East Hemlock, Eureka, Hemlock, High Silver, Hudson River, Ida, Independence, Panamint Central, Marvel, Stewarts Wonder, Orion, Star, and Wyoming. Tetrahedrite, silver bromide, azurite, and malachite in parallel quartz veins in schist and limestone. No known production; idle since 1926. (Chalfant 33:285-292; Murphy 29:32; Norman and Stewart 51:78,182; Sampson 32:361-64; Tucker 20:280-81; 26:495,500; 38:451,477)
	Panamint Mines Co.						See: Tyler-Oster-Thurman group.
	Panamint Treasure (Gold Hill, Taylor, Treasure)	Louise Grantham, 809 East 6th St., Ontario (1951) Operator: C.W. James and W.D. Dodson, Lone Pine (1940)	8	22S	45E	MD	Class D. Gold mine located Warm Springs Canyon on the southeast slope of Gold Hill. Comprises 3 unpatented fraction claims and a millsite at Arrastra Springs; totals 90 acres. Quartz vein in limestone; developed by a 100-foot adit, 50-foot adit, and 40-foot shaft. Shipped 107 tons in 1932; smelter recovery in addition to high gold-silver was about 7% lead and 0.88% copper. Last operated in 1939-40 when 22 tons were milled and gold-silver recovered directly. (Eric 48:244; Norman and Stewart 51:47, 151,160; Sampson 32:369; Tucker 38:397,472,473, pl. 3)
	Parrott	H.C. Parrot, Keeler (1909)					Class D. Small shipment of gold ore in 1909 contained 10% lead in addition to high gold-silver.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Pay Day	J. H. Foelkel, Bishop (1935)	appr.	6S	34E	MD	Class D. Gold mine located in the Chidago district. Shipped ore and concentrates in 1935. In addition to gold-silver, 3053 pounds of lead and 300 pounds of copper were recovered from 36 tons of ore and 16 tons of concentrates. (Eric 48:249)
	Paymaster	Paymaster Mines, Death Valley (1925)	appr.	23S	43E	MD	Class D. Type 1. Small shipment of ore from the Slate Range district in 1925; smelter recovery 13 ounces of silver per ton and about 47% lead.
	Peg One Leg	W. R. Johns, Randsburg (1941)	appr.	17S	44E	MD	Class D. Type 1. Mine located in the Wild Rose district. Shipped several carloads of ore in 1938; smelter recovery was 16.3% lead, 11.6 ounces of silver, and 0.15 ounce of gold per ton. Last period of operation was 1938 to 1941 during which time gold ore was cyanided.
96	Pennsylvania	J. Carruthers (1942) Operators: C.E. Fashbaugh, Lone Pine (1942), L. D. Foreman (1951)	13	16S	37E	MD	Class D. Type 1. Mine located in the Swansea district near Keeler. Galena and cerussite in fissure in limestone. Developed by 135-foot vertical shaft. Recorded production between 1918 and 1942 of high silver-bearing lead ore. In 1951 a carload of dump material was shipped; smelter recovery was 4.87% lead, 7.44% zinc, and 5.78 ounces of silver per ton. In 1952 some ore was milled and concentrates shipped to Tooele and Anaconda; smelter recovery was 6.67% lead, 8.34% zinc, and 12.1 ounces of silver per ton of bulk of ore. (Eric 48:249; Norman and Stewart 51:183; Tucker 21:293; 26:495; 38:451, 477, pl. 3)
	Perry	Mrs. Agnes Reid, Panamint Springs. Lessee: Elmer Perry (1942)	appr. 30	17S	42E	MD	Class D. Type 1. One claim held by location in the northwest end of Panamint Valley at 2600 feet elevation. Lead and zinc occurs in a flat-lying deposit in gray dolomitic limestone near a low-angle fault. Blue limestone, volcanic rocks and igneous rocks underlie the deposit. Develop-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Perry (continued)						ed by 3 short adits by lessee in 1942. No production recorded. (Norman and Stewart 51:78, 183)
	Perseverance						See: San Lucas (Eric 48:249; Norman and Stewart 51:183)
	Pete Smith	William Skinner et al. Lone Pine (1938)		17S	39E	MD	Class D, Type 1. Six claims on the west slope of Inyo Range. Galena and cerussite replacement bodies in limestone adjacent to quartz monzonite intrusion. Worked by an inclined shaft on 3 levels. Reported shipping 360 tons in 1925. (Norman and Stewart 51:183; Tucker 26:495-96; 38:451, 477, pl. 3)
97	Pierson (Pierson Mining Co., Republic & Whiteside)	F. W. Finger, C. T. Pierson, 229 Holdeman Ave., Louisville, Kentucky Operator: C.L. Hohnberg, R. B. Whiteside, Independence (1929)	5	13S	36E	MD	Class D, Type 1. Twenty claims on the west flank of the Inyo Range. Irregular lenses of galena with cerussite in limestone near granite contact. Developed by a 50-foot shaft and about 2000 feet of adits. A shipment of ore in 1923 from the Republic showed a smelter recovery of 0.06 ounce of gold, 6.62 ounces of silver, and 13% lead. Ore shipped in 1925 and in 1929 contained 14 ounces silver per ton and 26.8% lead. (Norman and Stewart 51:183; Tucker 26:496; 38:451, 471, pl. 3)
	Pine Creek	U. S. Vanadium Corp. New York City, N.Y. (1954)	30,31 19,20	6S 6S	30E 31E	MD MD	Class D. Tungsten mine. Contact metamorphic deposit. Copper, silver, gold, and lead are recovered from concentrates as a by-product. (Bateman 45:231-49, pls. 36-46; Baker 49; Eric 48:249; Hess 21:274-76; Jenkins 42:317; Knopf 18:124; Lemmon 41:89-91, pls. 14, 17, 18; Norman and Stewart 51:91-94, 199, pl. 3; Partridge 41:295-96; Stewart 49:56; Tucker 21:301-02; 20:191; 26:511-12; 38:18; 38:460, 465-66, 477, pl. 3; 40:10, 27-28; 41:572-74; Young 26:605-06)
	Pine Tree	Harvey Searing, Trona (1938)		22S	45E	MD	Class D, Type 1. Six claims on the east flank of Inyo Range. Lead carbonate and galena in limestone. No known production. (Norman 51:183; Tucker 26:496; 38:477)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Piute	W. Wayt, Big Pine (1949)	appr.	7S	34E	MD	Class D. Gold prospect in the White Mountains. Made a small shipment of high grade gold-silver ore in 1949 to Wickenburg; smelter recovered 44.6% lead in addition to gold-silver.
	Poleta (Polita)	Charles H. Olds, Bishop, (1941) Operator: W. McGregor, Poleta (1903)	7,8	7S	34E	MD	Class D. Gold-silver mine in the Chidago district. Developed by a 500-foot adit, winze, and inclined shaft. Between 1892 and 1941 produced about $50,000 in gold-silver. Concentrates shipped to smelter also contained recoverable lead. (Eric 48:249; Tucker 38a:414; 40:24)
	Probstiel		appr.	9S	34E	MD	Class D. Type 1. Silver-lead mine in the Big Pine district. Small shipment of ore was made in 1918; smelter recovery was 17.67 ounces silver per ton and 47% lead.
98	Professor	P.E. Day, Independence	30	12S	36E	MD	Class D. Type 1. Vein containing galena. Developed by 1000 feet of workings including 2 adits. Production unknown. (Norman and Stewart 51:183)
	Promontory						See: Darwin Mines (Butner 49:5, fig. 5; Eric 48:250; Kelley 38:561, pl. 7; Norman and Stewart 51:183; Tucker 26:496; 38:451, 477; Waring 19:105-106)
	Pyper	V. P. Pyper, Big Pine (1909)	appr.	6S	37E	MD	Class D. Type 2. Shipped complex ore in 1909; smelter recovery was 0.05 ounce gold, 115 ounces silver per ton, 5% copper, and 10% lead. This was a small shipment; no subsequent production is known. (Eric 48:250)
99	Queen of the Mountains	Jack Carruthers, Swansea (1947) Operator: L.D.Foreman & Co. 1354-2nd Avenue, Salt Lake City, (1951)	13	16S	37E	MD	Class D. Type 1. Ore (tailings?) shipped in 1951 showed a smelter recovery of 3.1 ounces of silver and 5% lead. (Eric 48:250)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
100	Queen of Sheba (Ajax New Sutherland Divide, Carbonate)	I. Neiman, 211½ Arnez Dr., Beverly Hills (1953)	20,21	22N	1E	SB	Class B, Type 1. Nine unpatented claims on the east slope of Panamints in south end of Death Valley. Replacement bodies of galena with cerussite in Noonday dolomite overlying pre-Cambrian diabase. Dolomite at the Carbonate workings is highly brecciated and appears to lie at the sole of a low-angle thrust. A normal fault with a large displacement lies between the Carbonate and the Queen of Sheba workings. At the Queen of Sheba workings the thrust (?) is not seen and presumably lies at some depth. Ore, here, is controlled by steep faults in massive dolomite. Workings are shallow at the Carbonate and all within the broken thrust(?) sheet. The principal development at the Queen of Sheba is 2 tunnels with drifts, crosscuts and raises aggregating several thousand feet. Two periods of production are known, 1915 to 1935, and 1948-49. The latest activity was during 1952-53 when Goldfield Consolidated did some exploratory drilling. Ore shipped and milled has averaged about 15% lead, 6.33 ounces of silver, and recoverable copper and gold. Idle. (Eric 48:239; Newman 23:30; Norman and Stewart 51:76, 181; Tucker 24:33; 26:480; 38:430-31, 470, pl. 3; Waring 19:89-90).
	Radcliff	V. Claire, Lancaster (1950), W.D. Claire P.O. Box 5, Trona (1951)	8	22S	45E	MD	Class D. Gold mine in the South Park district, 6 miles east of Ballarat. Comprises 10 patented claims and millsite in Pleasant Canyon on the east slope of Panamints. Gold in quartz associated with base metal sulfides in a metamorphic complex. Developed by adits. Recorded production of over $100,000 in gold between 1897 and 1950. Concentrates shipped in 1949 also contained about 30% lead. (Murphy 29:118-20; Norman and Stewart 51:47-48,160; Sampson 32:373-76; Tucker 26:472; 38:415,477, pl. 3; 40:25; Waring 19:83)
	Rainbow						See: Shoshone (Norman and Stewart 51:183; Tucker 38:477, pl. 3)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Raven	Archie Farrington Estate, Bishop (1938)		15S	40E	MD	Class D, Type 1. Six claims in the Ubehebe district, 5 miles north of Dodds Springs. Galena with cerussite in limestone. No recorded production. (Norman and Stewart 51:184; Tucker 21:293; 26:496; 38:451,478, pl. 3; Waring 19:106)
	Red Cloud	Harry Briggs, Trona		23S	45E	MD	Class D, Type 1. Eighteen unpatented claims in the South Park Canyon basin in the Panamint Range. Lead-zinc replacement bodies in fractured limestone. Developed by 50-foot inclined shaft. Ore shipped in 1949-50 showed a smelter recovery of 17.7% lead, 20% zinc, 4.56 ounces silver, and 0.0944 ounce of gold per ton; also recoverable copper. A D.M.E.A. project was underway in 1952-53 to drive an adit below known ore reserves. (Norman and Stewart 51:79,184)
101	Red Dog	W.G. & W.J. Osborne Panamint Springs	16	19S	42E	MD	Class D, Type 1.Silver-lead-gold claim in Modoc district, 11 miles southeast of Panamint Springs. Vein in granite worked by trench and 16-foot shaft. Small shipment of ore in 1948 showed a smelter recovery of 0.30 ounce of gold, 51.9 ounces of silver, and 14.4% lead. (Norman and Stewart 51:184)
	Red Eagle (Blue Bird)	Miss Louise Grantham 809 East 6th Street Ontario (1948)		22S	47E	MD	Class D, Type 1. Six unpatented claims on the southwest slope of Gold Hill. Ore occurs in silicified fault breccia between limestone footwall and shale hanging wall. Ore shipped in 1948 contained 22% lead, 5.7 ounces of silver per ton, and recoverable gold, copper, and zinc. (Norman and Stewart 51:79,184)
	Red Wing	R.J. Fairbanks Shoshone (1938)		22N	7E	SB	Class D, Type 1. Prospect in the Resting Springs district Lead and zinc carbonate in dolomite. Developed by a 90-foot inclined shaft. No recorded production. (Hazzard 37:298; Norman and Stewart 51:184; Sampson 37:268;

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Red Wing (continued)						Tucker 26:497; 38:452, 478, pl. 3; Waring 19:106)
	Reed	R. C. Shear, Lone Pine (1910)					Class D. Gold-silver mine. Small shipment of ore in 1909 contained 55% lead, 62 ounces of silver, and 0.19 ounce of gold per ton. Also milled gold-silver ore in 1910.
	Reed Flat						See: Mexican. (Norman and Stewart 51:184)
	Reid	Shively, Peterson & Hopkins, Keeler (1937)		16S	38E	MD	Class D. Type 1. Lead-silver-gold mine. No recorded production. (Eric 48:250)
	Reno						See: Richardson. (Norman and Stewart 51:184)
	Republic						See: Pierson. (Norman and Stewart 51:184; Tucker 38:478)
102	Reward (Brown Monster)	Basil Prescott, Beverly Hills. Lease to: W.A. Wilson, Bishop Subleased to: T.L. Bright, Independence (1952)	3	14S	36E	MD	Class C. Type 2. Two patented and 6 unpatented claims and 2 millsites on west slope of Inyo Range. Large recorded gold-silver production from 1889-1901 and 1911-52, mainly by cyanidation. Some ore and concentrates have been shipped to Burton Bros., Midvale, and Selby with a total by-product recovery of 33,800 pounds of copper and 267,800 pounds of lead. Gold-silver production exceeds $300,000. (Burchard 84:160; Davidson 02:7,11; Eric 48:250; Knopf 14:116-119; 18:121-122; Norman and Stewart 51:48,161; Tucker 26:473; 38:386-388,478, pl. 3; 40:23; Waring 19:83)
103	Richardson (Reno)	C. W. Fletcher, Big Pine	13,24 18 19	 19S 19S	 40E 41E	 MD MD	Class D. Type 1. Lead-silver-zinc mine; also gold. No recorded production. (Davidson 02:7, Norman and Stewart 51:184; Tucker 38:478)
	Riff Raff						See: Estelle & Morning Star. (Eric 48:250)
104	Rio Tinto	C. W. Flecher, W. A.	24	19S	40E	MD	Class D. Type 1. Lead-zinc-silver prospect. No known

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Rio Tinto (continued)	Sanger, and Ralph Munger, 4431-8th Ave., Los Angeles					production. (Norman and Stewart 51:184; Tucker 38:478, pl. 3)
	Rip Van Winkle						See: Darwin (Kelley 38:548, pl. 6,7; Knopf 15:17; Norman and Stewart 51:185; Tucker 21:294; 38: pl. 3)
	Roberts	J.A. Muffett, et al. Big Pine (1917)	appr.	9S	34E	MD	Class D, Type 1. Located in Big Pine district. Gold mine from 1890-1901 during which time about $12,000 in gold-silver was produced by direct recovery. Several carloads of ore shipped to smelter in 1917 contained 15% lead, 7.5% zinc, and 9.0 ounces of silver per ton.
	Robin Hood		appr.	16S	38E	MD	Class D, Type 1. Silver-lead mine in the Cerro Gordo district. A shipment of ore in 1913 showed a smelter recovery of 39.3% lead, 33.2 ounces of silver, and recoverable gold and copper. (Eric 48:250)
	Rob Roy		appr.	21N	6E	SB	Class D, Type 1. Ore shipped from the Zabriskie district in 1915 contained 10.4 ounces of silver, 0.30 ounce of gold per ton, and 35.3% lead.
	Rocky Point						See: Cardinal (Norman and Stewart 51:147)
	Roosevelt (Franklin D. Roosevelt)	James W. Wrightman, Lone Pine (1941)	appr.	15S	37E	MD	Class D. Gold mine in the Independence district, about 14 miles from Lone Pine. Developed by an adit and open cut. Small shipment of ore in 1935 contained 9% lead, 1.07% copper, 19 ounces silver, and 0.855 ounce of gold per ton. Subsequent ore mined (1936-41) was milled and gold-silver recovered directly. (Eric 48:243; Norman and Stewart 51:175)
105	Rosario (Rosario Mining Co.)	Amos H. Perkins, Pasadena (1913)	31,32	28N	3E	SB	Class D, Type 1. Shipment of ore in 1913 contained 32.4% lead, 0.51 ounce silver and 0.029 ounce gold per ton. (Norman and Stewart 51:161; Tucker 38:478)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Rose	Ed M. Rose, Big Pine (1947)	appr.	11S	36E	MD	Class D. Type 1. Lead-silver prospect in the Fish Springs district. Small shipment of ore in 1947 showed a smelter recovery of 9.3% lead, and 6.25 ounces of silver per ton.
	Rose and Galena	John Cyty, Beatty, Nevada (1939) Ray Keene & Boyd Thompson, Beatty, Nevada (1941)	appr.	30N	1E	SB	Class D. Gold mine located in the Chloride Cliff district. Oxidized sulfide deposit in blue limestone. Developed by adit and winze, and a 45-degree inclined shaft. Shipped ore to smelter from 1931-36 averaging 1.13 ounces of gold, 2.7 ounces silver, 3.66% lead, and recoverable copper. Subsequent ore (1935 to 1941) was milled and gold-silver recovered directly. (Eric 48: 250; Norman and Stewart 51:185)
	Rose Quartz	D. E. Irwin, Bishop (1932)	appr.	7S	34E	MD	Class D. Gold prospect in Chidago district 16 miles from Sheley Siding on the S. P. narrow gauge line. Sulfide deposits developed by inclined shaft. In 1932 a small tonnage was milled and gold recovered directly. Concentrates shipped contained 3.77% lead in addition to gold-silver.
106	Royal (Cerro Gordo Extension & Spear)	Silver Spear Mining Corp., George Merritt, Pres., Santa Barbara (1951)	11,12 13,14	16S	38E	MD	Class C. Type 1. Thirty unpatented claims in the Inyo Range. Lead and zinc carbonate with some galena in 3 parallel veins in limestone. Developed by a 200-foot shaft, 800 feet of drifts and a 50-foot winze on the 200-level. The former owner was Cerro Gordo Extension Mining Co., c/o J.P. Hart, Box 157, Keeler (1937). Recorded production from 1909-37 totals over $30,000 in lead, zinc, silver, gold, and copper. (Eric 48:250; Norman and Stewart 51:79,185; Tucker 21:294; 26:497-498; 38:433-434, 470,478, pls. 3,4; Waring 19:106-107)
107	Ruona (Fairbanks, Santa Ana, Standard)	Mrs. Marie Wilson, 107 Meadowbrook Drive, San Francisco	11,13 14	19S	40E	MD	Class D. Type 1. Lead-silver-zinc prospect. (Kelley 38: 555,559, pl. 7; Norman and Stewart 51:185; Tucker 38: 472, 478, 479)
	St. Charles	Porter Ryan, Box 395,	appr.	20S	40E	MD	Class D. Type 1. Lead-silver mine in Coso district.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	St. Charles (continued)	Lone Pine (1948)					Shipped ore during 1948; average smelter recovery was 5.47% lead, 5.74 ounces silver, and recoverable gold and copper.
	St. George	J.C. Cress Estate Operator: Ray L. Glassbrook, Trona (1940)	8(?)	20S	42E	MD	Class D. Gold mine located in Snow Canyon, in the Modoc district. Comprises 12 claims. Two sets of quartz veins 2 feet to 4 feet wide occur in granite. Free gold is associated with the sulfides chalcopyrite, pyrite, arsenopyrite, and galena. Developed by 1000-foot adit. Small gold production between 1919 and 1940. Recoverable lead was contained in a small shipment of ore in 1933. (Norman and Stewart 51:50-51,162; Tucker 26:471; 38:418-20, 479,pl. 3).
	St. John						See: Minnietta (Eric 48:250)
	Salvage	C.H. Tyler, Trona (1932)	appr.	22S	45E	MD	Class D. Gold mine located in South Park district. Milled and recovered gold-silver directly in 1919 and 1920. Shipped ore to smelter in 1925 and in 1932. Ore contained 12.16% recoverable lead and 7.38 ounces of silver per ton in addition to high gold value.
	Sanger						See: Black Canyon. (Norman and Stewart 51:170)
108	San Lucas (Sam Lucas, Perserverance)	Sigurd Bo, Keeler (1918). J. Brenan Keeler (1947)	18	16S	39E	MD	Class D, Type 2. Seven claims in the Cerro Gordo district A 4 to 6 foot vein in limestone is developed by adits on 2 levels. Ore shipped from 1915 to 1918 showed an average smelter recovery of 2.55% copper, 17.2 ounces of silver, 0.63% lead, and 0.03 ounce gold per ton. (Eric 48:249; Knopf 18:117; Norman and Stewart 51:185; Tucker 26:498; 38:452, pl. 3)
	San Pedro	W.A. Coulter, San Pedro (1938)		9S	37E	MD	Class D, Type 1. Two claims on the east slope of White Mountains. Galena occurs in quartz veins in slate

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	San Pedro (continued)						and limestone. Developed by shafts and adits. (Norman and Stewart 51:185; Tucker 26:498; 38:452, 478, pl. 3)
109	San Rafael		5	20S	45E	MD	Class D, Type 2. Prospect on the west slope of the Panamint Range. Quartz vein on contact of schist and granite reported to assay 21% lead, 7% copper, and 4 ounces of silver per ton. No known production. (Eric 48:250; Norman and Stewart 51:185; Sampson 32:359; Tucker 26:465; 38: pl. 3); Waring 19:74)
110	Santa Ana (Santa Anna)		13	19S	40E	MD	Class D, Type 1. Fissure in limestone worked by 200-foot shaft on 3 levels. No known production. (See also Ruona). (Kelley 38:559, pl. 7; Norman and Stewart 51:185; Tucker 38:452,478, pl. 3)
	Santa Maria						See: Cerro Gordo (Chalfant 33:281; Knopf 14:97; 18:108; Norman and Stewart 51:185; Tucker 38:478; Waring 19:90)
111	Santa Rosa	Santa Rosa Min. Co. c/o Frank M. Benedict 912 Rowan Bldg., 4585 Spring St., Los Angeles (1952). Lease to: Anaconda Copper Co. (1952-53)	26,35	17S	39E	MD	Class A, Type 1. Comprises 6 patented claims 10 miles northeast of Keeler. A parallel series of steeply dipping fissure veins in quartzite, argillite and silicated limestone. Developed by a total of more than 4,000 feet of underground workings including 3 inclined shafts. Total production between 1911 and 1950 was 36,854 short tons of ore averaging 16.3% lead, 11.5 ounces silver, 0.66% copper, with minor zinc and gold. Exploration work is being conducted at present by Anaconda Copper Mining Co. (Eric 48:251; Knopf 14; 18; MacKevett 53; Norman and Stewart 51:79,186; Tucker 21:294; 24:189; 26:498-99; 38: 452-54, 478, pl. 3; Waring 19:107-108)
112	Scotty (Scotchman group)	Mearle H. Craig, Isabella (1939)	13	22S	44E	MD	Class D, Type 1. Located in the South Park district 65 miles east of Trona. Sulfide deposit developed by 100-foot shaft. Shipped ore in 1937 containing 50% lead and

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Scotty (continued)						15 ounces of silver per ton. Last produced in 1939 when 200 tons of gold ore was milled. (Norman and Stewart 51:162; Tucker 38:478)
	Schaffer	H. A. Schaffer, Keeler (1918)	appr.	16S	38E	MD	Class D. Type 2. Shipped complex ore between 1911 and 1918 containing 61.5% lead, 5.5% copper, and 77.2 ounces of silver per ton. Shipped several cars of high grade gold-silver ore in 1912. In 1920 a small shipment of silver-lead ore was made; smelter recovery was 15% lead and 19.2 ounces of silver per ton. These shipments probably did not come from the same property. (Eric 48:251)
	Seaman Zinc	Mr. Seaman, Darwin (1918)	appr.	19S	41E	MD	Class D. Type 1. Several shipments of 45% zinc ore were made from the Darwin area in 1918. This ore probably came from the Zinc Hill area northeast of Darwin.
	See Richard	Richard See, Zabriskie (1915)	appr.	21N	7E	SB	Class D. Type 1. Small shipment of ore from Zabriskie district in 1915; smelter recovery 54.5% lead, 21.4 ounces of silver per ton, and some gold.
113	Shoshone (Alexander, Apex Construction, Black Prince, Colombia No. 2, Grant, Gunsight, Mabel, Noonday, Oro Fino, Rainbow, and War Eagle)	Anaconda Copper, 25 Broadway, New York 4, New York (1953)	9,10 14,15 16,22 23,27	20N	8E	SB	Class A. Type 1. Comprises 18 patented and 41 unpatented claims and several millsites about 7 miles east of Tecopa. The ore is argentiferous galena, cerussite, and anglesite in replacement bodies and fissure veins in dolomite.Most of the ore occurs along a steeply dipping fault which strikes northwest.Tecopa Consolidated Mining Company,the former operator,shipped over 160,000 tons of ore between 1907 and 1931. The average smelter recovery was approximately 12% lead. The Alexander, Grant, and Noonday are credited with production of about 40,000,000 pounds of lead between 1914 and 1931. The War Eagle and Colombia produced about 36,000,000 pounds of lead and 8,000,000 pounds of zinc from 1942 to 1948. The production of the Shoshone Group has been over 29,000,000 lbs.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Shoshone (continued)						of lead and 8,000,000 pounds of zinc since 1949 alone. Ore milled in recent years has averaged about 8.8% lead, 6% zinc, and 4 ounces of silver per ton. Approximately 1/3 of the ore mined recently has been shipping grade and has averaged about 24% lead, 4.9% zinc, 10.5 ounces of silver, and 0.16 ounce of gold per ton. The mine was closed in March 1953 when exploration failed to develop further high-grade reserves. (Hamilton 20:37; Newman 23:611; Norman and Stewart 51:80-81,186; Sampson 37:264-267, 268-69; Tucker 21:286-87,291-93; 26:485,491-92,503-04; 38:426,440-42,448-50,458; 43:120; Waring 19:95-96, 103-04)
	Sierra Vista	A.T. Burch, Bishop (1937)	appr.	7S	34E	MD	Class D. Gold mine in the Chidago district. A shipment of concentrates in 1937 contained 35% lead and 19.5 ounces of silver per ton in addition to gold.
	Silver Bell						See: Skidoo (Norman and Stewart 51:162)
	Silver Bell	Patrick Miles, Tecopa (1916)	appr.	20N	7E	SB	Class D, Type 1. Shipped about 10 cars of ore in 1915-16; smelter recovery was about 10.8% lead with some silver and gold.
	Silver Button & Shamrock						See: Keystone (Norman & Stewart 51:186; Tucker 26:499-500; 38:454,478)
	Silver Dome						See: Lincoln (Norman and Stewart 51:186)
114	Silverite	E.H. Hughes, Darwin (1913)	19	8S	37E	MD	Class D, Type 1. Shipped silver-lead ore in 1912-13; smelter recovery was 7.46% lead and 30 ounces of silver per ton. (Eric 48:251; Tucker 38a: pl. 3)
115	Silver King		8	24S	43E	MD	Class D, Type 1. Located on the west slope of Slate Range. Galena and cerussite in veins in limestone near granodi-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Silver King (continued)						orite contact. Developed by an adit. No known production. (Norman and Stewart 51:186; Tucker 26:500; 38:455, pl. 3)
	Silver Peak-Hemlock						See: Panamint (Norman and Stewart 51:186)
	Silver Reef						See: Ventura (Norman and Stewart 51:186)
	Silver Reid						See: Lee Flat
	Silver Saddle (Gray Eagle)	Leo V. Howell, 1534 North Curson, Hollywood (1950)		19S	45E	MD	Class D, Type 1. Lead-silver-zinc mine reported active in 1949-50. No known production.(Norman and Stewart 51:186)
	Silver Spear (Silver Spear Mining Co.)						See: Royal (Norman and Stewart 51:186)
116	Silver Spoon	Theodore Peterson Darwin (1946) Bert Quinn, Box 71, Darwin (1951)	25 30	19S 19S	40E 41E	MD MD	Class C, Type 1. Comprises 5 claims on the west slope of the Argus Range. Galena and cerussite occur in 3- to 6-foot fissures in limestone. Ore shipped between 1929 and 1951 has averaged 18.2% lead, 0.63% zinc, and 4.68 ounces silver per ton. A shipment in 1948 ran considerably higher in zinc; 8.15 percent, also 16.4% lead, 5.33 ounces silver, and some gold.
	Skidoo (Silver Bell)	W.H. Gray, Box 1260 Ely, Nevada. Operators: W.L. Benge, Trona (1949), D.B. Harris, Box 4, Trona (1951), James H. Bennett, Box 4, Trona (1952)	19 or 20	17S	45E	MD	Class D. Gold mine located in the Wild Rose district on the west slope of the Panamint Range, 65 miles north of Trona. Comprises 12 claims. Two systems of quartz veins in quartz monzonite. Width 1 to 4 feet. Developed by 300-foot incline, 300-foot vertical shaft, and over 5000 feet of workings. Recorded production 1908-49, 1950-52 of over $1,000,000 in gold-silver. About 12,000 pounds of lead have been recovered as a by-product from concentrates shipped to smelters. Most of the ore has been cyanided or amalgamated.(Norman and Stewart 51:51,162; Tuc-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Skidoo (Silver Bell) (continued)						ker 26:473; 38:420-421,479,pl. 3; 40:10; Waring 19:83-84)
	Slate Range						See: Copper Queen group. (Eric 48:251)
	Small Pines	C.K. Engley, Big Pine (1913)	appr.	9S	33E	MD	Class D, Type 1. Big Pine district. Shipped ore in 1913; smelter recovery was 9.1% lead and 6.8 ounces of silver per ton.
	Smith	J.E. Smith, Big Pine (1909)	appr.	9S	33E	MD	Class D, Type 1. A small shipment of silver-lead ore from the Big Pine district in 1909 contained 38.8% lead, 26.7 ounces of silver per ton and some gold.
	Smuggler	W.R. Johns & Guy Fitch Trona (1937)	appr.	21S	42E	MD	Class D, Type 2. Comprises 3 claims on Mt. Argus in the Modoc district. A small shipment of ore in 1937 showed a smelter recovery of 4.22% lead, 4.56% copper, and 105 ounces of silver per ton.
	Sorba						See: Lane and Darwin. (Eric 48:251; Norman and Stewart 51:187)
	South Bend	South Bend Mining Co., Big Pine (1947)	appr.	11S	36E	MD	Class D, Type 1. Located in the Fish Springs district. Small shipment of ore in 1947 contained 7.1% lead and 17.2 ounces of silver per ton.
	Southwest						See: Darwin (Tucker 38:479)
	Spear	R.C. Spear, Lone Pine (1917)					See: Royal (Eric 48:251; Norman and Stewart 51:187; Tucker 21:294; Waring 19:106-07)
	Staats	D.E. Staats, Keeler (1911)	appr.	16S	39E	MD	Class D, Type 1. Located in the Cerro Gordo district. Small shipment in 1911; smelter recovery was 42.2% lead, and 35 ounces of silver per ton.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
117	Standard		13,14	19S	40E	MD	Class D, Type 1. Comprises 11 claims in the Darwin district. Lenses of galena with cerussite in silicated limestone along fissures. Worked by adits and open cuts. (See also Ruona) (Kelley 38:559, pl. 7; Norman and Stewart 51:187; Tucker 38:453, 479, pl. 3)
	Star						See: Panamint. (Norman and Stewart 51:187; Tucker 38:479, pl. 3)
	Sterale		appr.	9S	33E	MD	Class D, Type 1. Small shipment from Big Pine district in 1918 contained 43.6% lead, 26.5 ounces of silver, and 0.04 ounce of gold per ton.
	Sterling	Sterling Mining Co. Trona (1938)		20S	42E	MD	Class D, Type 1. Comprises 6 claims in the Argus Range. Galena, argentite and silver bromide occur in a 4-6-foot vein at limestone and quartz monzonite contact. Worked by a 285-foot and a 120-foot shaft. A shipment of ore in 1918 contained 31.8% recoverable lead, 19.3 ounces of silver per ton and some gold. (Norman and Stewart 51:187; Tucker 38:17; 456,479, pl. 3).
	Sterling Queen	Pete De Freese and Elzo D. Smith, Brown (1939)	appr.	16S	39E	MD	Class D. Gold mine in the Cerro Gordo district. A shipment of ore in 1938 showed a smelter recovery of 8.54% lead, 6 ounces of silver, and 0.11 ounce of gold per ton. Subsequent ore was milled and gold-silver recovered by cyanidation. Last active in 1939.
	Stewart's Wonder						See: Panamint (Davidson 02:8; Jenkins 42:324; Murphy 29:104-05; Norman and Stewart 51:187; Sampson 32:363; Tucker 21:280-281; 26:495; 38:451, 479, pl. 3)
	Stockton	C.A. Stockton, Keeler (1918)	appr.	16S	39E	MD	Class D, Type 1. Located in the Cerro Gordo district. Ore was shipped in 1918; smelter recovery was 21% lead, 14.4 ounces of silver per ton, and some gold.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Stockwell	Stockwell Gold Mining Co., Box 597, Trona c/o E.E. Teagle (1942) Operator: W.A. Fritz P.O. Box 597, Trona (1952)	34 14	23S 24S	44E 44E	MD MD	Class D, Gold mine. Comprises 7 unpatented claims on the west slope of Slate Range. The mill is in sec. 14, T. 24S., R. 44E., about 3 miles south-west of the mine. Ore zone 3 to 30 feet wide occupies a shear zone of crushed quartz and talcose granite mineralized with auriferous sulfides pyrite, chalcopyrite, and galena. Development totals 7500 feet including adits and shafts. Shipped ore and concentrates to Selby in 1952 containing recoverable lead and copper in addition to gold-silver. (Eric 48:251; Norman and Stewart 51:51-52,163; Tucker 38:422-23,479, pl. 3)
	Summit No. 2						See: Cerro Gordo. (Davidson 02:8; Norman and Stewart 51:187; Tucker 38:479, pl. 3)
	Sunset	Operator: L.B. Allen, Trona (1941)					See: Ventura (Eric 48:251)
	Sure Contest	H.L. Eckloff, Keeler (1937)		16S	38E	MD	Class D, Type 1. Shipped ore during 1937 containing 9.54% lead, 6.58 ounces of silver, and recoverable copper. (See also Estelle & Morning Star) (Eric 48:251; Norman and Stewart 51:187)
118	Surprise	A.L. Foss and J.L. Osborne Estate, Panamint Springs (1953). Operator: A.L. Foss, Panamint Springs (1953)	19	19S	42E	MD	Class C, Type 1. Three unpatented claims on east flank Argus Range. Irregular replacement bodies of galena in limestone. Ore is partially oxidized to anglesite and cerussite and contains minor sphalerite and smithsonite. The largest ore body mined was along the hanging wall of a reverse fault. Drag folds in part controlled ore deposition. Faults along which ore occurs also acted as channelways for dolomitizing solutions. Iron-rich jasperoid and manganese oxide are common gangue minerals. Workings include 3 adits with winzes and raises. Produced from 1947 to 1951, ore averaging 31.6% lead, 25.2 ounces

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Surprise (continued)						of silver, 0.084 ounce of gold per ton, and minor copper and zinc. Exploration work on a new block of ground was underway during 1952-53. (Norman and Stewart 51:81-82, 187)
	Surprise Package	Edward C. Fries, Independence (1942)	3,4, 9,10	14S	36E	MD	Class D. Gold prospect located 1/2 mile east of Manzanar Station on the Southern Pacific Railroad. Mine is developed by open cuts only. Produced gold by direct recovery between 1935 and 1940. A small shipment in 1942 contained 2.25% lead and 0.25% copper in addition to high gold-silver. (Eric 48:252)
119	Susquehanna	Micky Summers, Darwin (1951). Leased to: Darwin Lead Consol. Mining Co., 8350 West 3rd St., Los Angeles (1951)	23,24	19S	40E	MD	Class D, Type 1. Fissure trending northeast in silicated limestone near quartz diorite stock. Developed by a 50-foot shaft and 700 feet of drifts. No known production. (Kelley 38: pl. 7; Norman and Stewart 51:187)
	Swank						See: Mineral Hill. (Eric 48:252; Norman and Stewart 51:188; Tucker 38a:476)
	Swansea	A.J. Carothers, Keeler (1948), L.D. Foreman (1951)		16S	38E	MD	Class C, Type 1. Swansea district, southwest slope Inyo Range.Lead-silver-zinc along limestone and quartzite contact. Developed by a 70-foot inclined shaft and drifts. Shipped tailings and slag from smelter site in 1948 and 1951 containing from 3.94% to 7.54% lead, 2.5 to 4.76 ounces of silver, and 0.0 to 3.2% zinc with recoverable copper. Early mine production not known. (Norman and Stewart 51:188; Tucker 26:501; 38:456, pl. 3)
	Swansea Chief	C.L. Berryhill, Keeler (1912)		16S	38E	MD	Class D, Type 1. Located 4 miles northeast of Keeler. Galena and cerussite in fissure in limestone. Developed by 2 150-foot shafts. Shipped ore in 1912 containing 11.93%

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Swansea Chief (continued)						lead, 6.47 ounces of silver per ton, and some gold. (Norman and Stewart 51:188; Tucker 21:294; 26:501; 38:456, pl. 3)
	Sylvia	Pete & Fritz Miller, Trona (1951) Operator: Harry D. Smith, 1424 West Willow, Stockton (1951)	5(?)	20S	44E	MD	Class D. Gold mine located 4 miles from Wild Rose Station. Mine developed by a 60-degree inclined shaft and 2 adits. Milled a small tonnage of ore in 1951. In addition to gold-silver, the concentrates contained recoverable lead and copper. (Norman and Stewart 51:188)
	Tango	R.E. Johnson, Tecopa (1922)	appr.	20N	8E	SB	Class D. Type 1. Comprises 3 claims in the Resting Springs district; the Tango, Wonder, and Red Top. Ore shipped to smelter in 1922 contained 54.5% lead, 25.4 ounces of silver per ton, and some gold.
	Teasil	Ralph G. Boyle, Los Angeles (1947)	appr.	19S	37E	MD	Class D. Type 1. Small shipment of high-grade silver-lead ore in 1947; also contained recoverable zinc and copper.
	Tecopa Chief & Blue Reef	J.E. Vrooman, Ballarat (1915)	appr.	21S	45E	MD	Class D. Type 1. Shipped ore in 1915 from the South Park district; smelter recovery was 38% lead, 38.8 ounces of silver, and 0.015 ounce of gold per ton.
	Tecopa Consolidated	Tecopa Consolidated Mining Company					See: Shoshone Mines. (Operated the Gunsite and Noonday between 1908 and 1931, producing 20,000,000 pounds of lead, 140,000 pounds of copper, 950,000 ounces of silver, and 7300 ounces of gold.)
	Thorndyke	Johnson & Young, Trona, (1937)	appr.	21S	45E	MD	Class D. Type 1. Mine located in the South Park district. Shipped ore in 1937; smelter recovery was 44.5% zinc, 13% lead, and 3.8 ounces of silver per ton.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Tom Boy	Sponsley & Holmes Lone Pine (1918)	appr.	15S	35E	MD	Class D, Type 1. Mine located in the Alabama Hills near Lone Pine. Developed by 72-foot inclined shaft. Small shipment of ore in 1918; smelter recovery 24.2% lead, 286 ounces of silver and 0.143 ounce of gold per ton.
	Thompson						See: Darwin. (Eric 48:252; Jenkins 42:323; Kelley 38:557, pl. 3; Norman and Stewart 51:188; Stewart 48:56; Tucker 26:483, 486-87; 38:436-37; 41:567-68; 43:118)
	Townsend	C.R. Townsend, Keeler (1912)		16S	38E	MD	Class D, Type 2. Small shipment of ore between 1910 and 1912; smelter recovery 30% lead, 3.1% copper, 38.8 ounces of silver and 0.11 ounce of gold per ton. (Eric 48:252)
	Towser	A.G. Miller, Keeler (1922). Operator: James W. Wade, Darwin (1921)	appr.	17S	39E	MD	Class D, Type 1. Shipped about 3 cars of ore during 1921-22 containing 30.4% lead and 1.48 ounces of silver per ton.
	Trojan	George Pulver, Seattle, Washington (1908)					Class D, Type 1. Shipped ore in 1907-08 containing 22% lead, 3.86 ounces of silver per ton, and some gold.
	Tullos	Wm. B. Tullos, Keeler (1911)	appr.	16S	39E	MD	Class D, Type 1. Cerro Gordo district. A small shipment of ore was made in 1911; smelter recovery was 18.5% lead and 68.8 ounces of silver per ton.
	Tyler						See: Tyler-Oster-Thurman group.
	Tyler-Oster-Thurman (O.B.J., O.B. Joyful, Panamint Mines, Tyler)	C.H. Tyler, et al. Santa Barbara (1939)	9	20S	44E	MD	Class D. Gold mine located in South Park district, 41 miles northeast of Trona. Oxidized deposit developed by 4300 feet of adits, drifts, and raises. Gold-lead ore in crushed quartz veins and schist wallrock. Milled gold ore in 1938-39; also shipped to smelter one car of high-grade gold-silver ore from which was also recovered 1.36% lead. (Norman and Stewart 51:159; Sampson 32:371-72; Tucker 26:465; 38:413-14, 477, pl. 3)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
120	Ubehebe (Copper Bell)	Ubehebe Lead Mines, Inc., 356 South Spring Street, Los Angeles Lease to: Henry Hageman, Beatty, Nevada (1950), W.V. Skinner, 625 Muir Ave., Lone Pine (1951), Louis Hinds, Paul Mix, and Henry Hageman (1952)	1	14S	40E	MD	Class C. Type 1. Comprises 12 unpatented claims 4 miles north of Ubehebe Peak. Galena, and sphalerite, partially oxidized, occur in replacement bodies in limestone cut by diorite dikes. Mine has been operated since 1921. Developed by a 900-foot tunnel in 1949 and 750 feet of drifting in 1951. Ore shipped in 1951 averaged 13.8% lead, 4.93% zinc, 3.47 ounces of silver per ton,and some copper. A shipment to Tooele in 1952 contained about 12.4% lead, 12.4% zinc, 3.93 ounces of silver, and some copper and gold. (Eric 48:252; Norman and Stewart 51: 82, 188; Tucker 21:294; 26:501; 38:456,479, pl. 3; Waring 19: 109-110)
	Uncle Sam						See: Ophir. (Norman and Stewart 51:188; Tucker 38: 379, pl. 3)
	Union						See: Cerro Gordo. (Crawford 94: 24, 25; 96:32; Davidson 02:8,11; DeGroot 90:213, 214; Knopf 14:97; 18: 108; Tucker 20:33)
	Union						See: Monte Carlo. (Chalfant 33:139; Davidson 02:8; Goodyear 88:262, 264; Tucker 26:501-503; 38:457, 479; Waring 19:84)
	Uticala						See: Zinc Hill. (Norman and Stewart 51:189)
	Utah	Grundy Twiner, Skidoo (1912)	appr.	17S	45E	MD	Class D. Type 1. Mine located in the Skidoo district. A small shipment made in 1912 contained 9.47% lead and 458 ounces of silver per ton.
	Valez	Victor Reider, Beatty, Nevada (1933)	appr.	30N	1E	SB	Class D. Gold mine located in the Chloride Cliff district, 19 miles southwest of Beatty, Nevada. Sulfide deposit developed by a 40-foot adit and 20-foot winze. Shipped gold ore in 1933 containing recoverable lead as well as gold-silver.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Valley View	L. H. Baxter, Independence (1934)		30N	1E	SB	Class D. Type 1. Oxidized silver-lead deposit in the Chloride Cliff district. Developed by a 50-foot adit. Shipped ore in 1922 and 1925; smelter recovery was 35.3% lead, 11.74 ounces of silver and 0.296 ounce of gold per ton, and recoverable copper. Last ore shipped (in 1934) was straight gold-silver ore. (Eric 48:252)
	Vanderberg	David Vanderberg Bishop (1921)	appr.	7S	34E	MD	Class D. Type 2. Bishop district. Ore shipped during 1921 showed a smelter recovery of 9.22% lead, 2.27% copper, 106 ounces of silver per ton, and 0.089 ounce of gold per ton. (Eric 48:252)
121	Ventura (Silver Reef, Sunset)	Mrs. Ethel Thompson Rt. 3, Box 1015, Yucaipa (1951) Operator: S. J. Cannata Jr., 1850 West Manchester Avenue, Los Angeles (1949)	23	16S	38E	MD	Class C. Type 1. Comprises one patented claim and 15 claims held by location on the west slope of Inyo Range near Keeler. Galena and minor sphalerite occur in partially oxidized bodies in silicated limestone adjacent to quartz-monzonite intrusive. Developed by a 120-foot vertical shaft, and a 250-foot adit (on the Silver Reef claim). Silver Reef produced 78,885 pounds of lead between 1919 and 1925. Ventura and Sunset produced between 1911 and 1949 ore averaging 28.3% lead, 5.79 zinc, and 12.58 ounces of silver per ton. (Davidson 02:8; Eric 48:251-252; Knopf 14:102; 18:117; Norman and Stewart 51:82-83; 189; Tucker 21:295; 26:503; 38:426; 458, 479, pls. 3,4; Waring 19:110-111)
	Vermont						See: Keene-Wonder. (Norman and Stewart 51:154)
	Villa Real	Domingo Mining Co., 601 Merchants Trust Bldg., Los Angeles (1910)					Class D. Type 1. Recorded production in 1910 of 100,000 pounds of lead and 6000 ounces of silver from 200 tons of ore shipped to smelter.
	Virginia	Sanderson & Laird Independence (1912)	appr.	13S	35E	MD	Class D. Independence district. Milled gold-silver ore 1904-1905; direct recovery. Shipped gold-silver ore in 1912 containing recoverable lead.

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Wahoo	W. M. Hoover, Lone Pine (1939) Lease to: Paul Braun, Darwin (1940)		18S	40E	MD	Class C. Type 1. Silver-lead-gold in veins in quartz-monzonite. Oxidized deposit, developed by 90-foot shaft and 120 feet of drifts. Milled over 500 tons of gold ore from the oxidized zone in 1938-40. Shipped silver-lead ore during 1940, 1941, and 1947 averaging 15.3% lead, 20 ounces of silver, and recoverable copper and gold. (Eric 48:252; Tucker 40:25)
	Wallace	L. D. Foreman, 850 South 4th Street, Salt Lake City, Utah (1944)		20S	40E	MD	Class D. Type 1. Coso district. Shipped ore during 1944; average smelter recovery was 5% lead, 5.46 ounces of silver, and recoverable copper and gold. (Eric 48:253; Norman and Stewart 51:189)
	War Baby & Ark	D. Roe, Lone Pine (1941)		19S	38E	MD	Class D. Type 1. Milled low-grade lead-silver-gold ore in 1941. Concentrates shipped to smelter contained 14.4% lead, 2.58 ounces silver, 0.5 ounce of gold, and some copper.
	War Eagle						See: Shoshone (Norman and Stewart 51:189; Sampson 37:268-269; Tucker 26:503-504; 38:426, 458, 480, pl. 3)
122	Warren	W. Lucht and Benjamin Stockton, Big Pine (1947)	15	11S	36E	MD	Class D. Type 1. Fish Springs district. Lead-silver ore was milled during 1947. Concentrates which represented about 10% of the bulk ore contained 66% lead and 81 ounces of silver per ton. (Eric 48:253; Norman and Stewart 51:188)
	Waterson	Waterson & Company Bishop (1916)	appr.	7S	34E	MD	Class D. Type 1. Chidago district. About 6 cars of lead ore were shipped during 1916. Smelter recovery was 15.4% lead. Silver was not reported.
123	Waucoba	L.B. Bedell, Santa Paula (1941)	27	11S	37E	MD	Class D. Type 2. Tungsten-lead-silver-copper mine. Developed by a 40-foot adit in 1940. Recorded production in 1940-41. (Eric 48:253; Tucker 38a:480, pl. 3)

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Weir and Ball	Weir and Ball (1918)					Class D, Type 2. Small shipment of ore in 1918; smelter recovery was 14.32% lead, 2.67% copper, and 652 ounces of silver per ton. (Eric 48:253)
	Western Metals (Ingomar)	Western Metals Co., Salt Lake City, Utah (1918)	appr.	16S	39E	MD	Class C, Type 1. Cerro Gordo district. Shipped zinc ore in 1918; smelter recovery was 42% zinc.
124	Westgard (Chalmers)	Westgard Consolidated Mining Company, Tonapah, Nevada (1941)	14	7S	35E	MD	Class D, Type 1. Comprises 14 claims in the Deep Springs district on the east slope of Inyo Range, 16 miles northeast of Big Pine. Galena with cerussite in limestone at quartz-diorite contact. Ore body 2 to 6 feet wide. Underground development totals 650 feet of shafts and drifts. Shipped ore in 1937 and 1941; average smelter recovery was 14% lead; 14.52 ounces of silver per ton, and recoverable copper and gold. (Eric 48:253; Norman and Stewart 51:189; Tucker 21:284; 26:482; 38:458-59, 480, pl. 3)
	Westward Eagle						See: Eagle
	Whittier	M.H. Whittier, Los Angeles (1920)		7S	36E	MD	Class D, Type 1. Lead-gold-silver mine in the Big Pine district. Ore shipped in 1918, 1920; smelter recovery was 40% lead, 0.85% copper, 2.07 ounces of silver and 0.372 ounce of gold per ton.
	Wiggington	James Wiggington, Keeler (1918)		16S	38E	MD	Class D, Type 1. Cerro Gordo district. Small shipment of silver-lead-gold-copper ore in 1918; smelter recovery was 12% lead, 14.5 ounces of silver per ton, and recoverable copper and gold. (Eric 48:253)
	Wilshire-Bishop						See: Cardinal (Norman and Stewart 51:147)
	Wingate Pass	Howard L. Rogers, 958 South Blaine St., Los		21N	2E	SB	Class D, Type 1. Located 2 miles east of Wingate Pass manganese deposit. Lead molybdate ore reported to assay

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Wingate Pass (continued)	Angeles (1942)					from 13 to 20% lead. Developed by an 80-foot shaft. No known production. (Norman and Stewart 51:189)
125	Wonder (Wallace Wonder)	L.D. Foreman (1947)	13	19S	40E	MD	Class D, Type 1. Comprises 4 claims in the Argus Range near Darwin. Lenses of galena with cerussite occur along a fissure in silicated limestone. Fluorite and coarsely crystalline calcite are common gangue minerals. Considerable ore was shipped in 1947 showing a smelter recovery of 2.45% lead, 3.84 ounces of silver per ton, and recoverable copper. The mine is developed by adit and shaft. (Eric 48:253; Kelley 38:559, pl.7, Knopf 15:16-17; Norman and Stewart 51:189; Tucker 26:465,504; 38:459,480, pl. 3)
	Wyoming						See: Panamint (Davidson 02:8; Murphy 29:98-103; Norman and Stewart 51:190; Sampson 32:363-64; Tucker 26:495; 38:451, 477, pl. 3)
	Ygnacio						See: Ignacio and Cerro Gordo. (Eric 48:253; Norman and Stewart 51:190; Tucker 38a:442,480)
	Yoeman	A. Yoeman, Tecopa (1913)	appr.	20N	8E	SB	Class D, Type 2. Shipped complex ore in 1913; smelter recovery was 36.5% lead, 5.10% copper, 10.9 ounces of silver per ton, and recoverable gold.
	Zabuski-Gilbert	J.A. Gilbert (1914)					Class D. Shipped high-grade gold-silver ore in 1914 containing 3.44% lead and 1.35% copper. (Eric 48:253)
126	Zinc Hill (Utacala, Colorado)	Combined Metals Reduction Company, 218 Felt Bldg., Salt Lake City, Utah (1951)	35 or 2	18S 19S	41E 41E	MD MD	Class B, Type 1. Comprises 5 claims on the west slope of the Argus Range near Darwin Wash. A total of 12 claims were held in 1920 by J.E. Blie, Salt Lake City, and by R.J. Wright and Thomas Taylor, Panamint Springs in 1949. Ore bodies are replacements of sphalerite with some galena, in limestone along bedding planes and controlled by

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Zinc Hill (Utacala, Colorado) (continued)						2 sets of faults, one striking N 35E and the other due East. The ore bodies, largely oxidized, were up to 25 feet thick and 50 feet in strike length. Workings are all shallow; mainly open cuts and shallow adits. The earliest recorded production was 2721 tons of 44% zinc ore in 1917-20. In 1925 and 1941 to 1949 about 3000 tons of ore were shipped; average smelter recovery was about 20% zinc, 1.56% lead, 1.53 ounces of silver per ton, and recoverable gold and copper. (Eric 48:240,252,253; Norman and Stewart 51:82-83, 189,190; Tucker 21:294-95; 26:503; 38:458,470,479, pl. 3; 43:120)
	Unknown	R.L. Franklin, Big Pine (1942)		10S	34E	MD	Class D, Type 2. Located in the Fish Springs district. A small shipment of complex ore in 1942 showed a smelter recovery of 17.60% lead, 5.22% copper, 60 ounces of silver and 0.60 ounce of gold per ton. (Eric 48:238)
	Unknown	J.W. Johnston, et al. Cartago (1947)	appr.	19S	42E	MD	Class D, Type 1. Located in the Modoc district(?). Possibly Zinc Hill district. Shipped ore in 1947 containing 27.80% zinc, 13% lead, 9.57 ounces of silver per ton, and recoverable copper.
	Unknown	Whitfield McLeod, Darwin (1942)	appr.	20S	40E	MD	Class D, Type 1. Located in the Coso district. Small shipment of ore in 1942; smelter recovery was 30.70% lead, and 16 ounces of silver per ton.
	Unknown	A.G. Scott, Shoshone (1943)	appr.	20N	8E	SB	Class D, Type 1. Located in the Resting Springs district. Ore shipped to smelter in 1943 contained an average of 14.85% lead, 7.11 ounces of silver per ton, and some gold.
	Unknown	Louis Warnken, Jr. Keeler (1945)		16S	38E	MD	Class D, Type 1. Located in the Coso district. Ore shipped in 1943 and 1945 showed an average smelter recovery of 5.64% lead, 9.85 ounces of silver per ton, and recov-

INYO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Unknown (continued)						erable copper. (Eric 48:238)
	Unknown	Homes Weeks, Keeler (1945)	appr.	20S	40E	MD	Class D, Type 1. Located in the Coso district. Ore shipped to smelter in 1945 contained 0.45% lead, 29.60 ounces of silver and 0.0588 ounce of gold per ton with some copper.

KERN COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
127	Beehive	Kern Rand Miner Inc. Bakersfield (1929)	32(?)	28S	40E	MD	Class D, Type 1. Comprises 10 claims on the south slope of the El Paso Mountains, 7 miles north of Randsburg. Narrow veins mineralized with lead, silver, and gold. Development shallow. No known production. (Tucker 29:57; 49:270)
	Big Blue	Kern Development Co. C.S. Long, pres., Hayward (1949). Lease to: Kern Mines Inc., Kernville (1949)	28,33	25S	33E	MD	Class D. Gold mine. Comprises 3 claims in the Cove district, ½ mile north of Kernville at 2900 feet elevation. Claims are the Beauregard, Lady Belle, and Sumner. Development consists of a 3000-foot adit, 510-foot inclined shaft, 400-foot vertical shaft, and over 2000 feet of drifts and raises. The ore, consisting of pyrite, arsenopyrite, chalcopyrite, galena, and gold, occurs in a silicified shear zone between alaskite and granodiorite. The maximum width is 125 feet. A large gold-silver production is recorded for the period 1930 to 1942. Production prior to 1900 was about $36,000 in gold. During the last period of operation, 6,500 pounds of copper and 69,000 pounds of lead were produced as a by-product. (Brown 16:488-89; Crawford 94:142; 96:186,198; Eric 48:254; Goodyear 88:313; Prout 40: Tucker 24:40; 29:27-28; 33:289-291; 38:11; 40:28,324,379,421; 49:211-12, 254)
	Black Bob	George L. Harris 2636 Sunset Avenue Bakersfield	9,10	9N	20W	SB	Class D. Gold mine located 40 miles south of Bakersfield. Developed by a 150-foot vertical shaft, 100-foot tunnel, and several hundred feet of drifts. Produced 1932 to 1934 about 800 tons of gold-silver ore containing some lead.
128	Blackhawk	J.A. Darnell, Bakersfield (1945). Operators: Pacific Atlantic Metals Corp., Pasadena (1945). Ducor Mining Co., R.C. Halton, 1104	28	30S	33E	MD	Class D, Type 1. Comprises 8 claims in Caliente Canyon, 14 miles northeast of Caliente at an elevation of 3000 feet. Lead-zinc ore in a 4-6-foot vein at granite and limestone contact. Vein strikes north and dips 70 degrees west. Developed by a 150-foot adit. Produced 1944-45 ore averaging 4.33% lead, and 7.15% zinc. (Tucker 49:238,270)

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Blackhawk (continued)	West 99th Street, Los Angeles (1951)					
129	Black Mountain	C.A. Skaggs, Randsburg (1934) Operator: Charles Brewer, Los Angeles (1949)	10	29S	39E	MD	Class D. Type 2. Mine located 13 miles northeast of Cantil. Small tonnage produced in 1934; smelter recovery was 3.30% lead, 3.80% copper, 7.20 ounces of silver and 0.40 ounce of gold per ton. (Eric 48:254; Tucker 29: 29; 49:254)
	Blue Chief	Blue Chief Mining Co., San Francisco (1935)	15	26S	31E	MD	Class D. Gold mine located 8 miles south of Glenville. Developed by a 170-foot vertical shaft, and drifts. Concentrates shipped in 1934 and 1935, contained recoverable lead and copper in addition to gold-silver. (Eric 48:254)
	Blue Eagle						See: Cactus Queen. (Eric 48:254; Tucker 49:254)
	Cactus Queen (Blue Eagle)	Cactus Queen Mines Co. Rosamond (1943) Burton Mines Inc. Florey and G. Stenwedel, Rosamond (1952)	17	10N	13W	SB	Class D. Gold mine located 7 miles southwest of Mojave. Comprises 500 acres on the southwest slope of Middle Buttes, at 3000 feet elevation. Vein 7 to 12 feet wide near contact of monzonite and rhyolite; strikes N 45°E and dips 35° SE. Ore minerals are pyrite, arsenopyrite, marcasite, galena, and proustite. Developed by 787-foot incline, 450-foot shaft, and 2000 feet of drifts, raises and winzes. Large recorded gold-silver production between 1935 and 1952. Some copper and lead have been recovered from concentrates shipped to smelters. (Eric 48: 254; Tucker 35:469,471-472; 38:11; 49:216-17, 255)
	Commonwealth	Commonwealth Company Randsburg (1920)	appr.	25S	33E	MD	Class D. Gold mine located in the Cove district north of Kernville. Small production of high-grade silver ore in 1920, containing recoverable lead, copper, and gold. (See also Big Blue, Tucker 49:256)
	Churchill	J. A. Foisee, Randsburg (1929)	20	28S	40E	MD	Class D. Gold mine. Comprises 50 acres in the Radamaker district, 9 miles northwest of Randsburg on the south

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Churchill (continued)						slope of the El Paso Mountains. Narrow veins 12 inches to 18 inches wide in granite are mineralized with argentiferous sulfides. No known production. (Tucker 29:57; 49:271)
	Condor	W. W. Stabler, Los Angeles (1943)					Class D. Type 1. Ore shipped to smelter in 1943 contained 17.50% zinc, 1.97 ounces of silver per ton, and recoverable copper and lead. (See also Tejon Ranch.)
	Culley & Hayes						See: Tejon Ranch.
	Desert Queen						See: Standard group.
	Exposed Treasure						See: Standard group.
	Four Star	E. Blickenstaff, Mojave (1942)	33	11N	12W	SB	Class D. Produced gold-silver ore between 1939 and 1942 containing 9271 pounds of lead and 1823 pounds of copper as a by-product. (Eric 48:255)
	Golden Queen	Golden Queen Mining Company, Box 296, Mojave Operators: George Scibird, Campo Seco (1949), N. W. Sweetner & Bert Meyers, Rosamond (1952)	6,7	10N	12W	SB	Class D. Gold mine located 4½ miles south of Mojave. Quartz vein 10 feet to 100 feet wide in felsite and rhyolite porphyry is mineralized with free gold and minor sulfides including argentite, galena, and chalcopyrite. Developed by over 5000 feet of tunnels and several thousand feet of diamond-drill holes. Large recorded production of gold-silver between 1936 and 1942, and in 1952. Some copper and lead have been recovered as a by-product. (Julihn 37:14-16; Kumke 37:27-33; Tucker 35:472-473, 475-479,482; 38:10; 40:30-31,33-34; 49:220-223,259)
	Hummer		30(?)	28S	40E	MD	Class D. Gold-silver prospect (?). Comprises 7 claims south of El Paso Peak. Narrow quartz vein in granite, mineralized with argentiferous galena and gold. Developed by 114-foot inclined shaft. (Hulin 25:138; Tucker 29:57; 49:271)

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
130	Jeannette-Grant	Jeannette-Grant Mining Company, George Bergner, Pres., Harrisburg, Pennsylvania, N. C. Anderson, Manager, Bodfish	4,10	28S	34E	MD	Class D. Type 1. Comprises 24 claims in the Green Mountain district in the Piute Mountains, 15 miles south of Weldon at an elevation of 5500 to 6,000 feet. Parallel veins in schist near limestone contact contain pyrite, sphalerite, and gold. Lenses of sphalerite also occur in the limestone. Gold value is reported from $3.50 to $6.00 per ton. A production of $13,000 from stibnite taken from a slate limestone contact is reported. No production of zinc ore is known. (Tucker 40: 328; 49:225, 261)
	Jersey Lilly						See: Monarch Rand.
	Kelso						See: Tejon Ranch
	Mispah-Montana	Mispah-Montana Mining Company, Herman T. Miller, Pres.	1 6	30S 30S	40E 41E	MD MD	Class D. Silver prospect. Comprise 20 acres in the Rand district. One and one-half miles southeast of Randsburg at an elevation of 3800 feet. Two brecciated siliceous veins in granite are mineralized with pyrite, stibnite, cerargyrite, miargyrite and galena. No known production. (Hulin 25:138; Tucker 23:168; 29:58; 49: 271)
	Mispah-Nevada	Mispah-Nevada Mining Company, M. F. Pierson, Pres., Bakersfield	1 6	30S 30S	40E 41E	MD MD	Class D. Comprises 4 silver claims in Rand district, 1½ miles southeast of Randsburg at an elevation of 3850 feet. Three parallel quartz veins 8 inches to 12 inches wide in granite, are mineralized with argentiferous sulfides. No known production. (Hulin 25:138; Tucker 23:168; 29:58)
	Monarch Rand (Jersey Lilly Group)	Monarch Rand Mining Company, E. P. Wallace, pres., Randsburg	1,12	30S	40E	MD	Class D. Gold-silver mine. A 3-foot vein on the hanging wall side of a quartz-latite dike in schist is mineralized with pyrite, stibnite, galena, silver, gold,

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Monarch Rand (continued)	Operator: George Knudsen, Sutter Creek, (1951)					and tungsten, in a siliceous gangue. The only recorded production has been in silver and gold recovered by amalgamation between 1933 and 1950. (Jenkins 42:330; Tucker 29:58; 41:576-577; 49:271)
	Napoleon						See: Santa Ana. (Tucker 49:267)
	Pearl	Charles Gillett Mojave (1933)	appr.	11N	12W	SB	Class D. Produced about 100 tons of gold-silver ore containing recoverable lead between 1901 and 1933. (Operation was intermittent).
	Quartz	J. Hudison Piute (1895) Operator: Unknown (1914)					Class D. Gold mine. Recorded production in 1914 of 81 tons of ore containing 4.10% lead, 27 ounces of silver, and 2.20 ounces of gold per ton.
	Rand Contact	Rand Contact Mining Company, Los Angeles, S.G.Dixon, pres.(1929)	7,18 12,13	30S 30S	41E 40E	MD MD	Class D. Comprises 4 silver claims in the Rand district, 3 miles southwest of Johannesburg. Quartz vein 1 to 2 feet wide along granite-schist contact. No recorded production. (Tucker 23:168; 29:58-59: 49:271)
131	Rattlesnake Group	Mrs. J. S. Bishop Cantil, Calif. (1929)	5	29S	38E	MD	Class D, Type 1. Comprises 2 claims on the south slope of the El Paso Mountain about 5 miles north of Saltdale. A series of parallel veins 1 to 2 feet wide in granite are mineralized with galena and some chalcopyrite. Cerussite and copper oxides occur in the oxidized zone with gold and silver. Development shallow. (Tucker 29:59; 49:271)

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Red Wing	Red Wing Mining Co. Fred G. Risley, pres., 207 Haberfelde Bldg., Bakersfield (1949) Operator: Fred Risley, Box 336 Ridgecrest, Calif. (1951)	26,35	27S	40E	MD	Class D. Comprises 6 gold-silver claims (3 of which are patented) in the Rademaker district, 3 miles north of Searles at an elevation of 3500 feet. Granite traversed by lamprophyre dikes is cut by quartz stringers to 3 feet in width. Ore minerals are pyrite and galena with gold and silver. Developed by open cuts. Produced some gold-silver between 1937 and 1951. (Tucker 49:231)
	Rinaldi & Clark	Rinaldi & Clark					Class D, Type 2. A total of 69 tons of complex ore shipped between 1911 and 1913 contained about 55 ounces of gold, 1200 ounces of silver, 33,000 pounds of copper, and 20,000 pounds of lead. Three shipments were made; a gold shipment, a copper shipment, and a silver-lead shipment.
	Robinson	J. H. Robinson Piute (1908) Monroe E. Bechtel Kernville (1938)	appr.	30S	33E	MD	Class D. Gold mine located about 25 miles east of Bakersfield in the Agua Caliente district. Small production recorded between 1908 and 1938. Recoverable lead was contained in concentrates shipped. Developed by a 50-foot inclined shaft and 80 feet of drifts.
	St. John	W. H. Curtis 4612 Coldwater Canyon Ave. North Hollywood (1950)	22,23 3,4	28S 29S	35E 35E	MD MD	Class D. Comprises 8 gold claims 16 miles south of Weldon at an elevation of 5100 feet. Granodiorite cut by aplite dikes. A quartz vein along a fault adjacent to a monzonite dike is mineralized with gold, auriferous pyrite, stibnite, some arsenopyrite, and minor galena. Developed by a 400-foot incline, 285 feet of drifts. Equipped with a 25-ton cyanide mill. Production has been small. Former operators were Karl Struss, Hollywood, and R. W. Prout, San Fernando (1937). (Tucker 29:47; 33:276, 327-328; 40:37; 49:233, 268)

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Santa Ana (Napoleon)	Harry Richardson Red Mountain (1940) George Carr, Bakersfield (1949)	11	30S	40E	MD	Class D. Gold-silver mine. Comprises 40 acres, 2½ miles southwest of Randsburg at 4,000 feet elevation. Small vein in schist. Reported production of $400,000 between 1896 and 1903. Large recorded production of gold-silver between 1910 and 1940 during intermittent periods of operation. Minor lead was recovered from concentrates shipped in 1937. (Brown 14:485, 509-510; Hulin 25:144; Tucker 33:276; 49:267)
	Standard Group (Exposed Treasure, Desert Queen, Yellow Rover)	Standard Hill Mines, E. B. Blickenstaff, Mojave (1952) Former Operators: Gordon Gray, San Diego (1949) A. J. Bruce, Mojave (1935)	32	11N	12W	SB	Class D. Gold mine. Comprises 100 acres patented and 60 acres unpatented, on Bowers Hill, 3½ miles south of Mojave at 2900 feet elevation. Seven parallel veins, 4 to 15 feet wide in rhyolite near monzonite contact are developed by a 400-foot shaft with 4 levels and a 900-foot crosscut; a 900-foot shaft with levels at 100-foot intervals; a 130-foot shaft; a 600-foot adit with a 150-foot winze from which 2 levels have been opened; and over 10,000 feet of drifts. A large recorded production of gold-silver ore containing recoverable lead and copper. (Brown 14:504-505; Crawford 96:193-194; Eric 48:256; Julihn 37:25-27; Tucker 23:160-161; 29:33-34; 33:301-302; 35:474; 49:218-219, 258)
	St. Lawrence Rand	California Rand Silver, Inc. Leased to: St. Lawrence Rand Mining Company, M. A. Dulgar, Pres., Bakersfield Operator: Frank W. Royer Red Mountain (1949)	1	30S	40E	MD	Class D. Silver mine. Comprises 180 acres, 2 miles southeast of Randsburg at an elevation of 3680 feet. Two parallel quartz veins 1 to 4 feet wide in schist, are mineralized with pyrargyrite, stephanite, cerargyrite, stibnite, galena and pyrite. A small production reported. (Hulin 25:143; Tucker 29:59; 33:170; 49: 268)

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
132	Tejon Ranch (Cully & Hayes, Kelso Condor(?)	Tejon Ranch Company, Brodie Hamilton, Pres., 202 West First Street Los Angeles and Condor Zinc Company, R. E. Bering, 811 West 7th Street, Los Angeles (1949)	35(?)	9N	18W	SB	Class D. Type 1. Comprises 640 acres under lease near Gorman. Zinc carbonate and sulfides reported in a 5 to 6 foot vein along a fracture in limestone. Reported assays of 30 to 33% zinc. No production is known (?). See also Condor. (Eric 48:256; Tucker 43:65; 49:276)
	Treasure Hill	Treasure Hill Mining Company, Frederic Downer, Pres., Bakersfield (1929)	1	30S	40E	MD	Class D. Gold-silver claim, $1\frac{1}{2}$ miles southeast of Randsburg at an elevation of 3750 feet. Two quartz veins 1 to 2 feet wide in schist are reported mineralized with silver-gold-lead. No known production. Hulin 25:143-144; Tucker 23:170-171; 29:60; 49:271)
	Wegmann Group	Margaret Wegmann Route 1, Box 2A, Mojave (1952)	appr.	10N	12W	SB	Class D. Gold-silver claim located on Soledad Mountain near Mojave. Mine developed by adits and shafts. Shipped silver-gold ore to Selby in 1952 containing recoverable lead as well as gold-silver.
	White Horse	White Horse Rand Mining Company, A. Sanger, Pres., Selma, California	1	30S	40E	MD	Class D. Gold-silver claim. Comprises 11 acres 2 miles southeast of Randsburg at an elevation of 3530 feet. Two parallel veins, 1 to 2 feet wide in schist reported mineralized with silver-gold-lead. (Hulin 25:144; Tucker 23:171; 29:60; 33:276; 49:271)
	Whitemore	Red Ink Mining Company, Harry Dennis, 7214 Sepulveda Blvd., Van Nuys (1952)	32	11N	12W	SB	Class D. Gold mine located one mile west of Fleta and $3\frac{1}{2}$ miles south of Mojave at 2700 feet elevation. Comprises 10 claims. Four parallel quartz veins 2 to 6 feet wide, in granite, along rhyolite porphyry dikes, are mineralized with auriferous sulfides and free gold. Pyrite is by far the most abundant sulfide. Development consists of 6 shafts totaling 1000 feet, and about 2000 feet of drifts. A large gold-silver production is recorded for the period 1931 to 1952. Concentrates

KERN COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Whitemore (continued)						shipped have contained recoverable copper and lead. (Julihn 37:27; Tucker 23:152-153; 29:52; 33:277, 334-335; 35:484-485; 40:38; 49:236, 269)
	Yellow Aster	Yellow Aster Mining & Milling Company, Van Nuys Building, Los Angeles (1948) Operator: E. B. Atkinson, Box 101, Johannesburg (1952)	34,35 2,3	29S 30S	40E 40E	MD MD	Class D. Gold claim. Comprises 47 patented and 6 unpatented claims, 1/2 mile south of Randsburg. Siliceous veins in granite and schist occur along faults associated with rhyolite dikes. Ore minerals are gold associated with minor sulfides and scheelite. Operated continuously from 1897 to 1942. Minor lead and copper were recovered in concentrates shipped in 1937. (Brown 14:514; Cooper 36; Crawford 96:194; Froli 40; Hulin 25:121-125; Tucker 29:53-54; 33:277, 335-338; 40:38-43; 49:237, 270)
	Yellow Rover						See: Standard Group.
	Unknown	G. B. McElhinnie, Bakersfield (1942)	appr.	32S	36E	MD	Class D. Gold claim. Located in the Amalia district. A small shipment of gold-silver ore in 1942 contained recoverable copper and lead. (Eric 48:254)
	Unknown	B. A. Gordon, Isabella (1943)	appr.	26S	32E	MD	Class D. Gold claim. Located in the pioneer district. Made a small shipment of gold-silver ore in 1943 containing recoverable copper and lead. (Eric 48:254)

LASSEN COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Honey Lake (Badger Group)	Honey Lake Mining Co. c/o Ralph Wittenberg United Nevada Bank Building, Reno, Nevada (1935)	32	27N	15E	MD	Class D. Gold-silver claim located about 14 miles northwest of Doyle. Comprises 180 acres formerly known as the Badger Group (14 claims). A 5-foot fissure vein in granite, contains an 18-inch ore shoot reported to assay $30. in gold-silver. Developed by several thousand feet of adits on 2 levels. Recorded production of 430 tons of shipping-grade ore in 1933-35; copper and lead were also recovered at the smelter. (Averill 36:435-436)

LOS ANGELES COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Acton	L. M. Kellogg Frazier Park (1934)	appr.	5N	12W	SB	Class D. Gold-silver mine located in the Cedar district. Ore shipped to smelter in 1934 contained 16.32% lead and 6.12 ounces of silver in addition to gold.
	Big Horn	Mrs. F. C. Fenner 1017 West Lake Los Angeles (1937) Operators: American Metals Co. Ltd. N.Y.C., New York (1937) Big Horn Mining Co. c/o R.C. Huffman 610 Brisbane Bldg. Buffalo, New York (1935)	7, 8	3N	8W	SB	Class D. Gold-silver mine. Comprises 8 claims, 28 miles east of Palmdale, 9 miles from Valyermo. Developed by a 1600-foot adit with raises. The vein is 25 feet wide, strikes N 40 to 60E., dips 17NW, and outcrops 300 feet along contact between granite gneiss and mica schist. Large gold-silver production 1903-1908, and 1934-1936 from low-grade ore. By-product copper and lead were recovered also. (Eric 48:259; Sampson 37:178-179)
133	Black Jack	Santa Catalina Island Company William Wrigley, Jr., pres.	Santa Catalina Island				Class B, Type 1. Mine located on the northeast slope of Black Jack Mountain, 2 miles west of White's landing on Santa Catalina Island at an elevation of 1540 feet. Vein carrying galena, sphalerite, and silver in hornblende schist. Assays reported 6% zinc, 1 to 3% lead, and 2 to 3 ounces of silver per ton. In 1927 daily production was about 40 tons. Total production between 1925 and 1927 was over 39,000 tons from which was recovered an average of 5.14% zinc, 2.05% lead, and 2.98 ounces of silver per ton. The mine was developed by about 2000 feet of adits and winzes. (Preston 90:279-280; Sampson 37:198; Tucker 27:32-38)

LOS ANGELES COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Chance						See: Pacoima Canyon
	Denver Mining & Milling						See: Pacoima Canyon. (Sampson 37:198; Tucker 21:318; 27:288,315)
	Fenner						See: Pacoima Canyon
	Indicator						See: Pacoima Canyon
	Kelsey	T. H. Knapp & Assoc. Azusa, California Operators: J. C. Jens, Los Angeles (1927) E. J. Knapp, Cadiz (1934)		2N	9W	SB	Class D. Comprises 4 unpatented gold-silver claims, 5 miles north of Azusa in the Silver Mountain district at an elevation of 3000 feet. A 4-foot vein along a fault in schist and hornblende gneiss is mineralized with gold, silver, and lead. The only known production was a small shipment of gold-silver ore in 1934. (Sampson 27:198; Storms 93:245; Tucker 27:315-316)
134	Pacoima Canyon (Denver, Chance, Fenner, Indicator, Red Ledge)	W. S. McGrew and W. B. Folger National Bank Bldg San Fernando	10,11	3N	14W	SB	Class D, Type 2. Occurences of complex ores containing antimony, copper, nickel, cobalt, lead, and zinc, in a series of parallel quartz veins 2 to 4 feet wide in schist and gneiss. The Red Ledge has a maximum width of 50 feet. The ore occurs in lenticular shoots within the quartz veins. Ore minerals identified include pyrrhotite, chalcopyrite, galena and sphalerite. (Eric 48:259; Sampson 37:198; Tucker 21:318; 27:288, 315)

LOS ANGELES COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
135	Quarry	Santa Catalina Island Company William Wrigley, Jr., president	Santa Catalina Island				Class D, Type 1. Located on Santa Catalina Island, $1\frac{1}{4}$ miles southeast of Avalon at an elevation of 300 feet. Vein in andesite reported to assay 9% zinc, $1\frac{1}{2}$ to 2% lead, and 3 ounces of silver. An ore shoot 4 feet by 150 feet was developed on 2 levels 85 feet apart from a 250-foot winze sunk from a 310-foot tunnel which continues eastward for another 180 feet. Production probably included with Black Jack which also see: (Sampson 37:198; Tucker 27:316-317)
	Red Ledge						See: Pacoima Canyon.
136	Renton Vein	Santa Catalina Island Company William Wrigley, Jr., president	Santa Catalina Island				Class D (?), Type 1. Located on Santa Catalina Island, 2 miles southeast of Avalon at an elevation of from 700 feet to 1100 feet. Five parallel veins in andesite are reported to assay 8 to 12% zinc, 1.5 to 2% lead, and 2 to 3 ounces of silver per ton. Production may have been combined with Black Jack. (Sampson 37:198; Tucker 27:36, 316-317)
	Silver King	W. H. Cruzan Newhall, California	appr.	3N	13W	SB	Class D, Type 1. Comprises 18 claims at an elevation of 2350 feet in Texas Canyon, 12 miles northeast of Saugus. A 2-foot quartz vein reported mineralized with galena and 10 to 30 ounces of silver per ton. No known production. (Sampson 37:198; Tucker 27:317)

LOS ANGELES COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Victoria	Sierra Madre Silver Mining Company Azusa, California (prior to 1927)	appr.	2N	11W	SB	Class D, Type 1. Mine located 6 miles northeast of Azusa in San Gabriel Canyon at an elevation of 3000 feet. Silver-lead mineralization reported. No known production. (Sampson 37:199; Storms 93:245; Tucker 27:317)
	Unknown	T. R. Cottrell Gorman, California (1942)		8N	16W	SB	Class D, Gold mine located in the Neenach district. Shipped gold ore to smelter in 1942 containing recoverable lead and copper. (Eric 48:259)

MADERA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Agnew Meadows Group	Agnew Meadows Mining Corporation Frank Shaw, pres., Compton (1934)	appr.	3S	26E	MD	Class D, Type 2 (?). Comprises 12 claims and a fraction, on the east side of Agnew Meadows in the Middle Fork basin. Veinlets of disseminated sulfides are reported in a zone up to 50 feet wide in meta-rhyolite. Developed by shaft and crosscut adit. No known production. (Erwin 34:75; Laizure 28:338)
	Alta						See: S. P. Group.
	Biladeau						See: Bradford.
	Bliss & Barcroft	H. M. Bliss North Fork, Calif.	appr.	3S	25E	MD	Class D, Type 1. Comprises 2 groups of claims (total 7) on the west side of Banner Peak, Ritter Mountains. Three large and two small veins (maximum width 22 feet) in slate and meta-volcanics, are mineralized with argentiferous galena. Vertical extent proven is 50 feet. The nearest outcrop of granite is 2½ miles to the west. No known production. (Erwin 34:77-78; Laizure 28:339)
	Blue						See: S. P. Group
	Boulder						See: S. P. Group
137	Bradford Group (Biladeau, Mount Raymond, Star)	L. M. Bradford, Box 207, Madera and J. Wesley Smith, Box 777, Madera (1950)	9,10	5S	22E	MD	Class D, Type 2 (?). Comprises 6 claims on the southwest slope of Mt. Raymond. Veins mineralized with chalcopyrite, sphalerite, galena, pyrite, and magnetite occur in metamorphic rocks; principally quartzite, intruded by granite and aplite dikes. The only known production is 53 tons of 13.75% copper ore

MADERA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bradford Group (continued)						in 1911. (Eric 48:261; Laizure 28:335; Logan 50:459-461, 477)
	Bruce						See: Galena King.
	Buena Vista						See: S. P. Group.
	Burris Lead Claims	F. P. Burris, Route A, Box 145, Fresno (1934)	appr.	3S	25E	MD	Class D. Type 1. Comprises 2 claims adjoining Bliss & Barcroft, in the upper basin of the North Fork River at approximately 9300 feet elevation. Parallel quartz veins with a maximum width of 12 feet are mineralized with argentiferous galena and sphalerite. Prospected by open cuts. High silver assays are reported. No known production. (Erwin 34:77; Laizure 28:340)
	California Copper						See: Daulton.
	Crown Point						See: Nidever Group. (Erwin 34:73-74)
138	Daulton (California Copper, Ne Plus Ultra)	Madera Mining Company, L. M. Bradford, Box 207, Madera (1948) Lease to: A. J. Oyster, San Francisco (1943)	25,35	9S	18E	MD	Class D. Type 2. Comprise 60 acres patented; located about one mile southeast of Daulton Station. Shear zone in kyanite schist is replace in part by fine-grained sphalerite and chalcopyrite. The property is developed by 2 vertical shafts. Assays report as high as 7% zinc, however, no production of zinc is recorded and only 222 pounds of lead are known to have been recovered. Ore shipped between 1915 and 1948 contained an average of 16.68% copper, 17.10 ounces of silver, minor lead and gold, and an unknown percentage of zinc. During the same period and in 1951, cement-copper was precipitated from mine water. The total recorded production since 1915 is less than 300,000 pounds of copper. Production prior to 1915 is not known. (Aubury 08:207; Boalich 21b:

MADERA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Daulton (continued)						83; Eric 48:262; Laizure 28a:322; Lang 07:1007; Logan 50:450-453, 471; McLaughlin 16:538; Storm 00:149)
	Fortuna Group						See: Nidever Group. (Erwin 34:73-74)
	Francis		appr.	5S	22E	MD	Class D. Type 2. Located in the Mount Raymond district. Zinc-copper prospect similar to the S.P. Group. Sphalerite and galena with chalcopyrite and pyrite occur in veins in quartzite and limestone intruded by granite and aplite dikes. No known production. (Eric 48:262; Laizure 28a:336)
	Galena King Group (Bruce Group)	H. M. Bliss, North Fork Operators: L. R. and R. B. Harris, North Fork (1930)	appr.	2S	25E	MD	Class D. Type 2. Claims located on northwest slope of Mt. Lyell at the extreme north end of the Ritter Range, at an elevation of 10,000 feet. Two intersecting veins traceable for about 1500 feet along outcrop. Country rock is diorite, limestone, and basalt. Developed by a vertical shaft from which 50 tons of ore were taken. This probably remains on the dump since only 5 tons are reported shipped. Smelter recovery was 52.50% lead, 1.40% copper, 30.20 ounces of silver per ton, and 0.60 ounce of gold per ton. (Laizure 28:340)
	Heriford & Butler Group	C. Heriford and B. Butler, Laws	appr.	3S	26E	MD	Class D. Type 2. Adjoins Agnew Meadows Group; geology same; disseminated sulfides in meta-rhyolite. (Erwin 34:75)

MADERA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
139	Jessie Bell	H. J. Buchenau, Box 17, Star Route, Madera (1952) Lease to: W. M. Hoff, 243 South Olive, Los Angeles, (1943) John E. Sisson, 456 Subway Terminal Bldg., Los Angeles (1944)	13 18,19	9S 9S	18E 19E	MD MD	Class D, Type 2. Located on the Daulton and Buchenau ranches. Mica schist intruded by quartz diorite is impregnated with chalcopyrite, pyrite, pyrrhotite, and some sphalerite along shear zones in quartz veins. Shipped ore between 1928 and 1944; smelter recovery was 6.85% copper and 1.58 ounces of silver, 0.473 ounce of gold per ton; zinc was not reported. In 1952 concentrates representing about 10% of the bulk ore were shipped; smelter recovery was 17.64% copper, 3.27 ounces of silver, and 0.519 ounce of gold per ton. Ore also contains cobalt. (Eric 48:151-157, 262; Forstner 08:747; Laizure 28:323; Logan 50:450-453, 471; Neale 27:499)
140	Johnson Group (Minaret)	Minaret Cons. Mining Company C. C. Randal, A. G. Bartlett Building Los Angeles (1931)	19(?)	3S	26E	MD	Class D, Type 2 (?). Comprises 34 claims adjoining Nidever Group, about 12 miles by road from Mammoth. Developed by a 300-foot shaft, open cuts, drifts, and about 2000 feet of diamond-drill hole. Reported shipping a car of lead-silver-copper ore valued at $60. a ton. No recorded production is known. (Bradley 26:546, 551; Eric 48:263; Erwin 34:74; Laizure 28a:340; Rand 31:611)
	Minaret						See: Johnson Group. (Erwin 34:74)
	Mount Raymond						See: Bradford Group.
	Ne Plus Ultra						See: Daulton
141	Nidever Group (Crown Point, Fortuna)	D. C. Nidever, Bishop and Myron Folsom San Francisco (1927)	12(?)	3S	25E	MD	Class D, Type 1. Comprises 9 claims on the north side of Shadow Creek. Two parallel zones in limestone are mineralized with argentiferous galena, sphalerite and

MADERA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Nidever Group(continued)	C. W. Stewart 410 Thorne Street Fresno (1950) Operator: Carol S. Plant Bishop (1940)					chalcopyrite. A zone 75 feet wide and a zone 150 feet wide are reported over a width of 600 feet. Developed by open cuts only. A small shipment of ore was made in 1940 from the Fortuna Claim; smelter recovery was 18.35% lead, and 10.50 ounces of silver per ton. (Bradley 26:547, 548; Eric 48:263; Erwin 34:73-74; Laizure 28:340,341; Logan 50:459, 477)
	Pilot						See: S. P. Group.
	Scandia		appr.	5S	22E	MD	Class D, Type 2. Located in the Mount Raymond district southeast of the S.P. Group. Sphalerite, galena, chalcopyrite, and pyrite in limestone and quartzite intruded by granite and aplite dikes. Ore showings are similar to those at the S.P. Group. (Eric 48:263; Laizure 28:336)
	S. P. Group (Buena Vista, Wonder, Blue, Zinc, Pilot, Keystone, Boulder, Alta)	John Broad, 1535 Chestnut Street, Oakland; John Francis and W. L. Funkhauser Madera	appr.	5S	22E	MD	Class D, Type 2. Comprises 8 claims just east of the Bradford Group. Argentiferous galena, sphalerite, chalcopyrite, and pyrite occur in limestone and quartzite intruded by granite and aplite dikes. (Laizure 28:335)
142	Star	Mrs. E. M. Whittlesey San Francisco (1928)	10	5S	22E	MD	Class D, Type 2. Located 5 miles northeast of Fish Camp on the slope of Mt. Raymond. Veins mineralized with sphalerite, galena, chalcopyrite, pyrite, and magnetite occur in shattered metamorphic rocks intruded by porphyry dikes, aplite dikes, and granite. Reported discovered in 1888. Developed by open cuts. No known production. (Eric 48:263; Laizure 28:334)

MADERA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sullenger Group (Tom Agnew Group)	J. R. Sullenger Fresno					Class D, Type 2. Group of 8 claims northwest of Agnew Meadows on the east slope of the Middle Fork Canyon at 9500 feet elevation. Wide zone of 1 to 2 foot quartz veins between slate and meta-volcanics, are mineralized with pyrrhotite, sphalerite, chalcopyrite, native silver and bismuth sulfides. This is the order of introduction of the ore minerals as seen in polished section. Only shallow prospecting work has been done. No production is known. (Erwin 34:70, 75)
	Tom Agnew Group						See: Sullenger Group.
	Wonder						See: S. P. Group.
	Zinc						See: S. P. Group.
	Keystone						See: S. P. Group.

MARIPOSA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Akoz						See: Aspozien
143	Aspozien (Akoz, B.A.B.)	Aspozien Company F. V. Keesling, 1205 De Young Bldg. San Francisco (1928) M. Erickson La Grange (1944) L. M. Brady, Merced Falls (1945)	9,10	4S	15E	MD	Class D, Type 2. Comprises 80 acres, about 6 miles northeast of Merced Falls. Sericite schist, silicified tuffs, and greenstone dikes (meta-volcanics of the Amador Group), mineralized along sheared, sericitized zones as at the Blue Moon. Ore minerals reported are triboluminescent sphalerite, tetrahedrite, galena, chalcopyrite, gold, silver and pyrite. Gangue minerals include sericite, chlorite, quartz, and barite. Drilled by the U. S. Bureau of Mines during World War II. A total of 1907 feet in 3 diamond-drill holes failed to develop ore. The only recorded production except for minor sphalerite has been gold ore between 1941-1947 when by-product lead and copper were recovered in gold concentrates shipped. (Eakle 04:1000; Eric 48:265; Laizure 28:143; Lang 07:963; Wiebelt 47)
144	American Eagle	Volberde Bros. Hornitos (1943)	30	4S	16E	MD	Class D, Type 2. Shear zones in slate, chlorite schist, felsite, and greenstone, are silicified, sericitized, and pyritized. Ore minerals reported are sphalerite, tetrahedrite, galena, chalcopyrite, pyrite, and gold. This prospect is located just south of the Blue Moon. No known production. (Eric 48:133-150,265; Heyl 44; Laizure 28:124)
	B. A. B.						See: Aspozien

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Barrett (Barretta, Berette)	D. Jacobs, Coulterville (1932) Harry Barrett, Coulterville (1943)	29,30 32	3S	16E	MD	Class D. Gold mine with a small production. Copper and zinc reported in ore. (Aubury 05:215; 08:267; Castello 21:102; Eric 48:265; Lang 07:966)
	Blue Cloud						See: Blue Moon
145	Blue Moon (Blue Cloud, Red Cloud)	Hecla Mining Company Wallace, Idaho Operator: Red Cloud Mines Inc. Hornitos, Calif. (1943)	19	4S	16E	MD	Class A, Type 2. Fine-grained sulfides replacing sheared, laminated felsite along large shear zone. Some greenstone occurs along contact between massive felsite and schistose tuff (?) in the mine area. Silicification, sericitization, and pyritization have been intense along shear zone; greenstone is highly choloritized. Developed by two shafts, 150 feet of drifts, and 5000 feet of diamond-drill hole (1942). Produced 1935-1946, 56,000 tons of ore reduced to 1200 tons of lead-copper-gold concentrate and 13,000 tons of zinc concentrate. Recoverable metal averaged about 12.50% zinc, 0.45% lead, 0.36% copper, 3.63 ounces of silver, and 0.0625 ounce of gold per ton of bulk ore. Ore was milled at the Jenny Lind mine near Hornitos. (Eric 48:133-150; Heyl 44)
	Bondurant	Bondurant Mining Trust Box 1648 Modesto (1928) Bondurant Mining and Milling Company San Francisco (1940)	24,25 36	2S	17E	MD	Class D. Gold mine. Comprises nearly 1000 acres, 12 miles northeast of Coulterville at an elevation of 3000 feet. Gold quartz veins mineralized also with galena and sphalerite. Developed by a 1500-foot inclined shaft, and a 1300 foot tunnel. Produced 1888 to 1940, intermittently, about 16,000 tons of gold-silver ore. Base metal recovered during this period

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bondurant (continued)						was 3600 pounds of copper and 85,000 pounds of lead.
							(Eric 48:265; Julihn 40:138-139; Laizure 35:map opposite p. 28)
	Champion	Mrs. M. C. Roy Mrs. Mary A. Mentzer (1928)	28	2S	16E	MD	Class D. Goldmine. Comprises 15 acres, patented, 2 miles north of Coulterville on Blacks Creek at an elevation of 1650 feet. A 6- to 12-foot quartz vein in slate is mineralized with free gold, galena, sphalerite, and tetrahedrite. Large gold production.
		Operators: Car Da Mining Co. Coulterville (1938)					(Eric 48:266; Julihn 40:110-111; Laizure 28:83; Logan 35:183; Preston 90c:302-304)
	Cotton Creek	Cotton Creek Mining Co Hornitos (1929)	22	4S	16E	MD	Class D. Gold mine located 15 miles east of Merced Falls in the Hunter Valley district. Developed by a 100-foot shaft. Produced 1937 to 1939, 4800 tons of gold ore reduced to 72 tons of concentrates from which was recovered 1600 pounds of copper and 1700 pounds of lead in addition to gold-silver.
							(Eric 48:266; Julihn 40:120)
	Feliciana	R. Wilson Midpines, California (1943)	13 7,8	4S 4S	18E 19E	MD MD	Class D. Gold mine developed by several 100-foot shafts, tunnels, and several thousand feet of drifts, cross-cuts and raises. Minor lead and copper have been recovered from 125 tons of concentrates shipped.
							(Eric 48:267; Laizure 35:33, and map opposite p.28)

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME; ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Fort Brice	F. J. Brice Cathay (1938) Operators: Big Four Mining Company, Cathay (1938)					Class D. Gold mine located 24 miles east of Merced. Developed by a 55-foot vertical shaft and 20-foot adit. Produced gold ore in 1938 containing minor lead.
	Granite King	E. E. McElliott, Mariposa (1941) Operator: Frank Carr and J. K. Wadley, Mariposa (1948)	10	6S	18E	MD	Class D. Gold mine developed by a 45-foot vertical shaft, 30-foot inclined shaft, and 230 feet of drifts. Produced about 9000 tons of gold ore between 1938 and 1941 containing minor copper and lead. (Eric 48:267; Julihn 40:134)
	Jenny Lind (Washington)	Lind Mining Company, Hornitos (1942) Red Cloud Mines Inc., Hornitos (1943)	4,5	5S	16E	MD	Class D. Produced about 5000 tons of gold ore in 1942 containing recoverable copper and lead. The Jenny Lind mill was used in 1943 to mill zinc ore from the Blue Moon mine. (Eric 48:267; Laizure 28:128)
146	La Victoria	Grace N. Cavagnero et al. Hornitos (1943) Lease to: R. B. Lamb, Mariposa, (1943)	4,9 10	4S	16E	MD	Class D (?). Type 2. Mine located in Hunter Valley. A narrow shear zone in greenstone is mineralized by massive fine-grained sulfides including pyrite, chalcopyrite, sphalerite, and chalcocite. Zinc is present up to 2.10%. Oxidized ore contains azurite, malachite, and chalcocite and averaged about 5% copper. The gangue is predominantly clear quartz. Production 1864-1917, about 4000 tons of copper ore. (Aubury 05:213-215; 08:265-267; Browne 67:151-152; 68:213; Castello 21:103; Eric 48:127-132,268; Julihn 40:167-168; Laizure 28:79; Lang 07:1010)

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lovely Rogers	S. Price, Post Office, Cathay, California Operator: Ernest L. Buerki Hornitos (1939)	appr.	2S	17E	MD	Class D. Gold mine located 7 miles northeast of Coulterville. Oxidized sulfide deposit developed by a 125-foot incline, 50-foot shaft, tunnels, and drifts. Stoped above the 100-foot level. Produce 1932-39, about 466 tons which was reduced to 9 tons of concentrate containing recoverable copper and lead in addition to gold-silver. (Castello 20:122; Laizure 28:96; Lowell 16c:587)
	Malvina Group (Melvina)	Boston California Mining Company, Sonora, California (1942)	4	3S	16E	MD	Class D. Gold mine originally located in 1852. A 2-to-20-foot quartz vein in silicified slate near diorite contact. Produced 1938 to 1942 about 120,000 tons of gold ore reduced to 1270 tons of concentrate containing 5000 pounds of copper and 24,500 pounds of lead in addition to gold-silver. About 1/2 of gold-silver produced was free metal recovered directly. (Castello 20:123; Crawford 94:172; 96:220; Eric 48:268; Fairbanks 90:39-40; Goodyear 88:347; Julihn 40:104-107; Laizure 35:36; Logan 35:183-184; Lowell 16c:587)
	Marble Springs Gold	Glenn-Steintorf Co. 3134 East 10th Street Oakland (1951)	30, 31	2S	18E	MD	Class D. Gold mine located 18 miles east of Coulterville on Bower Cave Road. Free-milling sulfide deposit, developed by an 80-foot shaft, 300-foot incline, and 250 feet of drifts. Equipped with a 50-ton mill. Produced 1918 to 1952 about 4297 tons of gold ore containing recoverable lead and copper as well as gold-silver. Concentrates are shipped to Selby.

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mount Gaines	Mt. Gaines Mining Company, Hornitos (1949)	35,36	4S	16E	MD	Class D. Gold mine located 6 miles northeast of Hornitos. Developed by a 1300-foot inclined shaft and several thousand feet of drifts. Equipped with a 60-ton amalgamation-flotation mill. Large recorded production between 1892-99, 1905-11, 1932-49; estimated at $2,000,000. Copper and lead have been recovered as a byproduct. (Eric 48:269; Julihn 40:121-125; Laizure 35:39)
	Nutmeg	Permit Mining Company, Harry H. Odgers, Supt., Midpines	30	4S	18E	MD	Class D. Gold mine located on Whitlock Creek, on the east side of Mt. Bullion. Oxidized deposit; developed by a 200-foot vertical shaft and about 400 feet of drifts. Produced 1938-1950 over 5000 tons of gold ore containing minor lead and copper.
	Ora Rica (Oro Rico)	J. C. Wilson, Coulterville (1912)	19,20 29	2S	16E	MD	Class D. Gold mine. Produced in 1912; concentrates shipped contained recoverable lead and copper. (Eric 48:269; Laizure 28:109; 35:40)
	Original	Original Mining and Milling Company, Merced (1937)	16,21 22,27	3S	19E	MD	Class D. Gold mine developed by a 334-foot inclined shaft, 676-foot inclined shaft, 5752 feet of tunnels and adits, and 1658 feet of drifts and crosscuts. Total production over 190,000 tons of ore; bullion recovered directly. Concentrates shipped contained recoverable lead and copper. (Eric 48:269; Julihn 40:143-145)
	Ortega	John Q. Finfrock, Mariposa (1939) Operator: Ortega Mining Company, Mariposa (1940)	19,24	5S	17E	MD	Class D. Gold mine located about 6 miles from Mariposa. Developed by a 167-foot inclined shaft and 367 feet of drifts. Equipped with a 20-ton amalgamation mill. Produced 1935 to 1940 about 4500 tons of ore containing some lead.

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Pine Tree & Josephine	Pacific Mining Company 1022 Crocker Bldg. San Francisco (1944)	8,9	4S	17E	MD	Class D. Gold mine located about 2½ miles south of Bagby. Developed by a 905-foot inclined shaft, 3200-foot tunnel, and several thousand feet of drifts. Equipped in 1943 with a 175-ton flotation mill. Produced 1933-1944 over 450,000 tons of gold ore which was reduced to 9000 tons of concentrate containing recoverable lead and copper in addition to gold-silver. (Eric 48:269; Julihn 40:107-110; Laizure 35: map opp. p. 28)
	Red Cloud						See: Blue Moon.
	Rutherford & Cranberry Group	F. F. Bass, 2801 Union Street, San Francisco Lease to: R. A. Fredericks, El Portal (1927)	15,22	3S	19E	MD	Class D. Gold mine. Comprises 8 claims and a mill site. Gold-bearing quartz veins in granite cut by diorite dikes. The principal vein is 1 to 5 feet wide and is mineralized with pyrite, arsenopyrite, and galena. Developed by a 200-foot shaft. Production not known. (Boalich 21b:112,136; Crawford 96:222; Laizure 28a:144; 35:43; McLaughlin 16:580, 596)
	Ruth Pierce	Tennessee Mining Co., Hornitos (1943)	13	5S	16E	MD	Class D. Gold mine located in the Hunter Valley district. Developed by a 600-foot vertical shaft and 1100 feet of drifts. Produced 1905 to 1943 over $450,000 in gold-silver. Some copper and lead were contained in concentrates shipped in 1918. (Eric 48:269; Julihn 40:126-127; Laizure 35:43)
	Texas Hill	G. D. Frank, Grant Building, San Jose, (1943)	7,8	3S	18E	MD	Class D. Gold mine developed by a 150-foot shaft and winze, 1500 feet of adits and tunnels, and several hundred feet of drifts. Produced about 3200 tons of

MARIPOSA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Texas Hill (continued)	Operator: Texas Hill Mines Company, Coulterville (1943)					gold ore 1919 to 1943. Concentrates shipped contained recoverable lead and copper. Most of the ore was treated at the mine and bullion recovered directly. (Eric 48:269; Laizure 35:45)

MONO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Alexander (Green Monster)	John A. and Howard Molini, 920 Bell Street, Reno, Nevada (1950) Operators: Fowler Mining Corp., Dyer, Nevada (1952)	appr.	2S	32E	MD	Class D. Type 1. Located on the South Fork of Indian Creek in the White Mountain district. Developed by a 50-foot inclined shaft, 50-foot tunnel, and 200-feet of drifting. The present operator is driving a new aidt, reported to be in 200 feet (1953); to develop a 12-foot vein. Ore shipped between 1938 and 1940 showed a smelter recovery of 4.20% lead, 93.20 ounces of silver, 0.9% copper, and some gold. In 1950 and 1952 ore was milled; concentrates amounted to 10% of the bulk ore and contained 26.80% lead, 133.40 ounces of silver, 2.03% zinc, and some copper. (Eric 48:273)
147	Antimony	Topaz Lead & Silver Mine, Minden, Nevada	27,28	10N	22E	MD	Class D. Type 1. Mine located 25 miles south of Minden, Nevada. Developed by 3 inclined shafts, 3 tunnels, 2 25-foot drifts, and open cuts. Recorded production 1936 to 1947; smelter recovery was 18% lead, 26 ounces of silver per ton, and 0.57 ounce of gold per ton.
	Argentite Maid	H. N. Scott, Dyer, Nevada (1952)	appr.	2S	32E	MD	Class D. Type 1. Located on Indian Creek, about 17 miles northwest of Dyer, Nevada, in the White Mountains. Developed by a 60-foot shaft and 40-foot adit. Milled a small tonnage of ore in 1952. Concentrates representing about 20% of the bulk ore contained approximately 37.50% zinc, 10% lead, 200 ounces of silver per ton, and 1.20 ounces of gold per ton.
	Banner (Old Glory)	Universal Ore and Milling Company, Reno, Nevada (1884)	18	3S	31E	MD	Class D (?). Silver mine (?). Comprises 19 claims in the Chidago district, 12 miles southwest of Benton, at an elevation of 8000 feet. Vein in granite; worked to a depth of 150 feet on the dip. Active 1870 to 1884; production undetermined.

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Banner (Old Glory) (continued)						(Whiting 88:378-379; Tucker 27:393; 40:141)
	Beckman	William B. Taylor Bishop (1949)		4S	31E	MD	Class D, Type 2. Mine located 24 miles southwest of Benton. Operated in 1936-1941 by Howerton & Richards, Benton. Developed by a 400-foot adit with drifts. Ore from the oxidized zone was first cyanided for gold-silver. In 1941 a shipment was made; smelter recovery was 7.76% lead, 3.17 ounces of silver per ton, 0.334 ounce of gold per ton, and 0.634% copper. In 1949 a small shipment to Garfield Smelter contained 9.10% lead, 2.45% copper, 4.66 ounces of silver per ton, and 0.668 ounce of gold per ton. (Eric 48:273)
	Benton	Pete Minnaberry and A. Goolsby Benton (1940)	appr.	2S	31E	MD	Treated tailing from the Benton Tailings Pond, Blind Spring Hill district, in 1940; average recovery was approximately 1.67% lead, 1.04% copper, 6.84 ounces of silver per ton, and some gold.
	Bismark	Alexander, Cabargo, & Malatesta					Class D, Type 1. Made a shipment of ore in 1924; smelter recovery was 26.26% lead and 40.20 ounces of silver per ton.
148	Blind Springs Hill	Conway & Minneberry, Benton (1935)	18	2S	32E	MD	Class C, Type 2. Comprises 26 claims in the Blind Springs Hill district. Produces 1913 to 1935. From 1913 to 1920, silver-gold-copper ore was produced; average recovery was 8.58 ounces of silver, 1.67% copper, and recoverable gold. Between 1920-1935, silver-lead-copper ore was produced, average smelter recovery was 60 ounces of silver, 19.46% lead, 0.668% copper, and 0.412 ounce of gold per ton. (Eric 48:273; Sampson 40:118, pl. 1)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Blonde Eskino	A. Lochrie, Mt. Montgomery, Nevada (1921)					Class D, Type 1. Small shipment of ore in 1921; smelter recovery was 5.28% lead, 92 ounces of silver per ton, and some gold.
	Blue Bird	J. F. Birchim, Bishop (1934)	19	3S	31E	MD	Class D. Gold mine developed by a 300-foot vertical shaft, 500-foot tunnel, and 3000 feet of drifts. Produced shipping-grade ore between 1931 and 1934; smelter recovery was 1.282 ounces of gold, 1.28 ounces of silver, 1.44% lead, and recoverable copper. (Eric 48:273; Sampson 40:118, pl. 1)
	Borasco	J. F., Millner, Benton (1895) F. B. Remington, Benton (1911) Operator: Blind Springs Hill Mining Company (1912)	7,18	2S	32E	MD	Class D (?). Silver mine. Siliceous veins in granite. Produced 1885-1899, about 48,000 ounces of silver by cyanidation. From 1911 to 1912 shipped silver-lead ore; smelter recovery was 154.80 ounces of silver per ton and 20.32% lead. For detail on Blond Springs Hill district, see Ransome 40. (Whiting 88:380)
	Casa Diablo	J. W. Bertram, Bishop (1948)	21,22	4S	32E	MD	Class D. Gold mine located 22 miles north of Bishop. Produced 1908 to 1948 about 10,000 tons of gold ore containing recoverable lead and copper as well as gold-silver. (Eakle 19a:172; Eric 48:273; Sampson 40:118, pl. 1)
	Casson	Casson Bros., Topaz (1911)	appr.	9N	22E	MD	Class D. Type 1. Small shipment of silver-lead-gold ore in 1911; smelter recovery was 33.40% lead, 33.80 ounce of silver, and 0.05 oune of gold per ton.

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Chidago	Kenneth Cline Coulterville (1938)	appr.	3S	31E	MD	Class D. Shipped gold ore and concentrates in 1938 containing recoverable lead as well as gold-silver.
	Comanche (Comanche & Kerrick)	Comanche Mining and Reduction Company, 725 Title Insurance Bldg., Los Angeles (1940) U. S. Metals Corp. Los Angeles (1942) Operator: Alden W. Holmes Sierra Madre (1942)	7,18, 19 13,24	2S 2S	32E and 31E	MD MD	Class D (?). Silver **mine**. Comprises 36 patented and 20 unpatented claims in the Blind Springs Hill district, 25 miles north of Bishop. Series of parallel quartz veins from 2 to 7 feet wide cutting granite. The principal ore mineral is freibergite. Ore shoots occur as discontinuous lenses 20 to 100 feet in length within the quartz veins. Developed by an 1800-foot inclined shaft, a 4300-foot tunnel, 1800 feet of drifts and 1800 feet of raises. A large recorded production in 1902, and 1924 to 1942, estimated at $2,000,000, mainly in silver. During the last period of operation some sulfide ore was shipped; smelter recovery was 97 ounces of silver, 1.75% lead, 1.75% copper, and 0.113 ounce of gold per ton. (Eric 48:273; Laizure 27:393-395; Ransome 40; Sampson 40:45-46, 118, 141; Whiting 88:376)
	Comanche Mining Company	W. C. Bouse Star Route Laws (1953)					Lease from U. S. Metals Corp., Los Angeles, on dump material on Blind Springs Hill. An estimate of over 1,000,000 tons of material expected to average $8 to $12 in silver-lead-copper. In June 1953 the American No. 1 dump was being loaded by slusher-scraper and ramp into dump trucks which haul the ore 14 miles to the mill on Highway 6, about 5 miles south of Benton. No production is yet reported.
149	Cooney Zinc	Mrs. Bertha Hall Glacier Lodge Big Pine, California	9(?)	2N	25E	MD	Class D, Type 1. Comprises 6 claims, 5 miles southwest of Conway Summit, at an elevation of 9400 feet. A lead-zinc sulfide body occurs as a replacement in lime-

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Cooney Zinc (continued)						stone and quartzite. Samples taken across a 40-foot zone assayed 18% zinc, 10% lead, and 5 ounces of silver per ton. Only minor development work has been done. (Laizure 27:395; Sampson 40:143)
	Cornucopia	U. S. Metals Corp. Los Angeles Operator: A. W. Holmes Sierra Madre (1941)	18	2S	32E	MD	Class D. Silver mine. Siliceous veins in granite contain shoots mineralized with freibergite and galena. (See Ransome 40 for general description of Blind Springs Hill district). Recorded production of over 70,000 ounces of silver between 1897 and 1901, mainly by cyanidation. Some ore was shipped in 1925; smelter recovery was 28% lead and 24 ounces of silver. The last known activity was in 1941 when some silver was recovered. (Sampson 40:140, 141, 162, 176; Whiting 88:380-381)
	Couch	Frank Couch					Class D, Type 1. Shipped silver-lead ore in 1912; smelter recovery was 26.10% lead and 16.45 ounces of silver per ton.
	Cracker Jack	D. E. Irwin, Bishop (1929)	appr.	3S	31E	MD	Class D. Gold ore shipped to smelter in 1929 contained recoverable lead and silver.
	Curtin	W. J. Curtin Bishop (1912)		5S	33E	MD	Class D, Type 2. Shipped sulfide ore in 1912; smelter recovery was 2.34% lead, 14.54% copper, and 17.16 ounces of silver per ton. (Eric 48:273)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Elder	E. J. Elder Benton (1922)	appr.	2S	32E	MD	Class D, Type 1. Silver-lead mine in the Blind Springs Hill district. Produced 1921-1922 small shipment of ore.
150	Eva Bell	J. C. McMillan Los Angeles (1929)	35	4S	34E	MD	Class D, Type 2. Mine located 15 miles west of Chalfant, in the White Mountains. Developed by a 125-foot adit and 135 feet of drifts. Produced in 1929; smelter recovery was 9.40% lead, 32.55 ounces of silver, 0.50 ounce of gold, and 2.84% copper. (Eric 48:273)
	Gold Wedge	Joseph Main, Benton (1939) Operator: J. F. Ivers and C. W. Jones, Bridgeport (1941)	13	3S	30E	MD	Class D. Gold-silver mine located 11 miles southwest of Benton, in the Benton Mountains at 7000 feet elevation. Comprises 14 claims. Two systems of quartz veins 2 to 4 feet wide in schist are mineralized with pyrite, galena, marcasite, gold, and silver. Developed by an adit. In 1929 a shipment of silver-lead ore was made; smelter recovery was 34.30% lead and 92 ounces of silver per ton. Operated intermittently between 1935 and 1941 during which time gold and silver were recovered by direct methods. (Sampson 40:124)
	Green Monster						See: Alexander. (Eric 48:273)
	Hudson	Willis Jones Benton (1942)	18	2S	32E	MD	Class D. Silver mine. Small shipment of ore from the Blind Springs Hill district in 1942; smelter recovery 111 ounces of silver per ton, 4% copper, and 7% lead. (Eric 48:273; Ransome 40:175; Sampson 40:118)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Johnnie Group	King Estate Bridgeport Operator: Louie Zelle Bishop (1939)	appr.	2S	32E	MD	Class D. Silver mine in the Blind Springs Hill district. Mine developed by a 300-foot tunnel. Produced intermittently between 1911 and 1939, gold-silver ore containing recoverable lead.
151	Huebner Group	Julius Huebner Bishop, California (1940)	15	3S	32E	MD	Class D, Type 1. Comprises 6 claims in the Chidago district in the Benton Mountains, 12 miles southwest of Benton, at an elevation of 6800 feet. Two parallel quartz veins, 2 to 4 feet wide in granite, are mineralized with pyrite, marcasite, galena, silver, and gold. Developed by a 125-foot inclined shaft. No known production. (Sampson 40:143-144)
152	Independence	Joseph Main Benton, California	4	3S	31E	MD	Class D, Type 1. Comprises 3 claims, 10 miles southwest of Benton at an elevation of 5750 feet. A massive outcrop of iron-stained quartz in limestone is mineralized with argentiferous galena. An adit driven 75 feet east with a 90-foot drift to the south found the vein to be 4 feet wide at a point 50 feet below the surface. A 150-foot shaft sunk on a parallel vein. Open cuts expose the vein for several hundred feet north of these workings. No known production. (Sampson 40:144)
	Kerrick						See: Comanche & Kerrick.

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Kentuck	J. E. and A. Y. Werner Sweetwater, Nevada (1911)					Treated old tailing by cyanidation in 1910 and 1911. See Silverado also.
	King Group	John King Benton (1940)	4	3S	31E	MD	Class D. Gold prospect. Comprises 6 claims in the Chidago district in the Benton Mountains, 10 miles southwest of Benton at an elevation of 7450 feet. A series of parallel quartz veins 2 to 4 feet wide in granite, just east of a rhyolite dike, are mineralized with pyrite, marcasite, and galena, with gold and silver. Developed by an incline and stoped to the surface from the 50-foot level. Production unknown. (Sampson 40:144)
153	Lemont Group	L. R. Monteque, F.C. Parmalee, C. W. Van Loon H.A. Van Loon Bishop, (1927)	15	2S	26E	MD	Class D, Type 1. Comprises 32 claims on a ridge north of Gull Lake at 7500 to 8000 feet elevation. Lead-zinc sulfide replacement of crystalline limestone. Disseminated mineralization over a wide belt; ore concentrated mainly along a northwest fissure where it replaces silicated limestone. Reported assay 20% lead, 17% zinc, 5 ounces silver. No known production. (Sampson 40:pl. 1; Tucker 27:396)
154	Livingston	Davis Bros. Topaz (1912)	31	7N	25E	MD	Class D, Type 1. Small shipment of lead-silver ore in 1912; smelter recovery was 31% lead, and 7 ounces of silver per ton. (Sampson 40: pl. 1)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lone Star	H. A. Van Loon, et al. Bishop, California	16	3S	31E	MD	Class D. Gold-silver prospect. Comprises 7 claims in the Chidago district 12 miles southwest of Benton, at an elevation of 7100 feet. Quartz veins in rhyolite are mineralized with galena, pyrite, marcasite, gold and silver. Maximum width of vein 3 feet. Development consists of a 125-foot, 2-compartment shaft with an 80-degree incline to the 185-level; levels at 125, 245, and 300, with 1000 feet of drifts and crosscuts on the 300-level. Assays reported 17% lead, 26 ounces of silver, and $10 to $20 in gold. No known production. (Sampson 40:145, pl. 1; Tucker 27:396-397)
	Long Chance & Vanelmart	H. A. Loon, Bishop (1935)	35	3S	31E	MD	Class D. Gold mine located 14 miles west of Hammil. Developed by a 325-foot winze from a 200-foot shaft; also about 700 feet of drifts. Mine was active between 1933 and 1936, during which time gold was recovered directly, some concentrates and ore were also shipped to smelters. Minor lead and copper were recovered as by-products. (Eric 48:274)
	Lucky Boy (Piper)	James Barrett, Oasis George Smith, Beaumont	29	5S	37E	MD	Class D. Gold mine. Comprises 4 claims on the west side of Fish Lake Valley, 1½ miles north of Cottonwood Creek, and 2 miles west of Oasis at an elevation of 5700 feet. A 2½-to 5-foot quartz vein in porphyritic granite is mineralized with galena, hematite, and free gold. Developed on 2 levels by adits connected by a 35-foot winze. No known production. (Sampson 40:124)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lyford	W. H. Davis Estate Benton, California	18	2S	32E	MD	Class D (?). Silver mine. Comprises 5 claims on the east slope of Blind Springs Hill, at an elevation of 6400 feet. A 1- to 3-foot quartz vein, striking N 15W., and dipping 20-35 degrees east, contains irregular lenses of secondarily enriched silver ore, typical of the Blind Springs Hill deposits. Ore minerals are stromeyerite, pyrargyrite, stephanite, cerussite, and oxidized copper minerals in a silica and hematite gangue. The primary ore minerals were galena, chalcopyrite, and tetrahedrite. The Lyford is one of the early producers in the district and is credited with a production of over $200,000 in silver. Lead recovery is not known. See also Comanche, Borasco, Cornucopia. (Ransome 40; Sampson 44:144-145; Whiting 88:382)
	Mahle	Charles Mahle, Benton (1926)		2S	31E	MD	Class D. Silver mine in the Blind Springs Hill district. Shipped 4 tons of primary ore in 1926; smelter recovery was 29.35% lead, 0.90% copper, 61 ounces of silver per ton, and 0.25 ounce of gold per ton. This ore was probably hand picked and is much higher grade than the primary ores reported from this district. It does show, however, the relative increase in copper-lead-gold content and decrease in silver content with depth. (See Ransome 40) (Eric 48:274)
155	Mammoth Consolidated (Crystal Craig, Mammoth)	Mammoth Mines Corp. Lease to: Crystal Craig Mining Company	9,10, 15,16	4S	27E	MD	Class D, Type 1. Located 4 miles southwest of Mammoth Post Office, 1 mile south of Lake Mary, at an elevation of 9200 feet. Comprises 27 claims. Pyrrhotite, pyrite, sphalerite, galena, and chalcopyrite in fracture zones in crystalline rocks (?) intruded by granodiorite. Developed by 2 adits. A gold producer between 1896-97.

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mammoth Consolidated (Crystal Craig, Mammoth) (continued)	Perry Elswick, Sec., 240 North Irving Blvd., Los Angeles (1940) Operator: Charles F. Pugh Mammoth Lake (1941)					In the period 1939-41, ore and concentrates shipped showed an average smelter recovery of 4.14% lead, 0.7% copper, 3.50 ounces of silver per ton, and 0.113 ounce of gold per ton. (Eric 48:274; Sampson 40:127, 128; Tucker 27:384-385; Whiting 88:373-375)
	Marietta	George Duncan, Benton (1912)	appr.	2S	31E	MD	Class D. Silver mine in the Blind Springs Hill district. Shipped oxidized ore in 1912; smelter recovery was 650 ounces of silver per ton, 0.95 ounce of gold per ton and 20% lead. Gold content in most of the Blind Spring Hill deposits was not important.
	May Lundy	Thomas R. Hanna, Martinez (1940)	30	2N	25E	MD	Class D. Gold-silver mine located 5 miles south of Lundy. Mine equipped with a 40-ton flotation mill. Milled about 2260 tons of gold-silver ore between 1935 and 1938. Minor lead and copper were recovered from concentrates shipped to smelters. (Eric 48:274; Tucker 38:13; Whiting 88:367-370)
	McLean		appr.	2S	31E	MD	Class D. Silver mine in the Blind Spring Hill district. A ton of sulfide (primary) ore was shipped in 1918; smelter recovery was 323 ounces of silver, 67 pounds of copper (3.33%), and 411 pounds of lead (20.58%); gold not reported. (Eric 48:274)
	Montecito	Margaret Stegar, Bishop (1941)	appr.	5S	33E	MD	Class D. Type 2. Mine located in the Chidago district. Small shipment of complex ore in 1941: smelter recovery was 14.65% lead, 1.03% copper, 23.20 ounces of silver per ton, and 0.40 ounce of gold per ton. (Eric 48:274)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Old Glory						See: Banner.
	Parrett	Hillis Parrett, Mono Lake Lease to: A. and W. J. Chastek, Los Angeles (1940)	19	2N	25E	MD	Class D. Gold mine. Comprises 14 claims in the Homer district, 1 mile west of Lundy at an elevation of 9000 feet. Two quartz veins 1 to 1½ feet wide in slate, intruded by granite are mineralized with pyrite, galena, and pyrrhotite with associated gold. Small recorded production 1896 and 1922-23. Lead is not reported recovered. (Crawford 94:182; 96:230; Eakle 19a:172; Sampson 40:130-131; Tucker 27:386)
	Pat Reddy		19	2S	32E	MD	Class D. Comprises 6 silver claims on the east slope of Blind Spring Hill, 4 miles south of Benton at an elevation of 5000 feet. (Sampson 40:145)
	Powell	Powell & Yates, Benton, (1920) Lee Flaxa, Benton (1942)		2S	31E	MD	Class D. Silver mine in the Blind Spring Hill district. Shipped ore in 1920; smelter recovery was 138 ounces of silver per ton, 0.147 ounce of gold per ton, 2.58% lead, and 3.06% copper. Produced some silver by direct recovery in 1942. (Eric 48:274)
	Prudential Pacific	Sam Meridith, Benton (1912)		2S	31E	MD	Class D. Small shipment of silver ore from the Blind Spring Hill district in 1912; smelter recovery was approximately 36% lead and 67 ounces of silver per ton.

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Recovery	H.L. Hager, Benton (1935) J. C. Holland, Bishop (1938)	24(?)	2S	31E	MD	Class D. Gold mine located 7 miles southwest of Benton. Developed by a 150-foot adit. Small shipment of ore in 1935; smelter recovery was approximately 15.40% lead, 1.45% copper, 20 ounces of gold per ton and 84.50 ounces of silver per ton. In 1938 gold-silver was produced by direct recovery. (Eric 48:274)
	Rose of the West	King Bros., Benton (1910-1914) John King, Benton (1936)	28	3S	31E	MD	Class D. Produced gold-silver in 1910, 1914, and 1936 from siliceous ore containing recoverable lead.
	Sacramento	J. B. Smith, Laws (1941) Operator: E. K. Lovelace, Bishop (1950)	2,11	5S	33E	MD	Class D. Gold mine located 3 miles northeast of Chalfant Siding. Developed by 9 adits from 100 to 900 feet in length. Recorded gold production 1889-1897. Comprises 6 claims on the west slope of the White Mountains at an elevation of 6000 feet. A 1-4-foot quartz vein in granite is mineralized with free gold associated with galena and chalcopyrite. The last period of operation was 1932-50 during which time minor lead and copper were produced from concentrates shipped. The major production has been by cyanidation. (Crawford 94:183; 96:230; Eric 48:274; Sampson 40:132; Tucker 27:388)
	St. Ives	Rasmussen & Grunwell Bishop (1936)		3S	27E	MD	Class D. Gold recovered by cyanidation 1909-36 intermittently. A shipment of sulfide ore in 1926

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	St. Ives (continued)						contained, besides gold-silver, 16% lead and 6% copper. (Eric 48:274)
	Sierra Vista	Sierra Vista Mining Company, Box 185, Bishop (1936) Operators: Smith and Jackson Long Beach (1943)	21	4S	31E	MD	Class D. Gold mine located 11 miles southwest of Benton. Comprises 25 claims in the Chidago district on the west slope of the Benton Range at 7300 feet elevation. Rhyolite and limestone intruded by diorite is cut by 3 parallel veins striking NW and dipping 40 degrees SW. Developed by 3 adits 200 to 500 feet in length. Produced gold 1926-1936, intermittently. Ore also contains about 2% combined lead and copper; also tungsten in the form of scheelite. (Eric 48:275; Sampson 40:133; Tucker 27:388-389)
	Silverado (Silverado & Kentuck)	Sierra Consolidated Mines Company John S. Sinai, Box 218, Reno, Nevada (1938)	18, 19, 30	7N	25E	MD	Class D. Comprises 15 silver claims in the Patterson district about 5 miles west of Sweetwater, Nevada, at an elevation of 8500 feet. A 4-foot quartz vein striking N 20° E., dipping 45 degrees west occurs between andesite in the footwall and rhyolite in the hanging wall. It is mineralized with pyrite, argentite, cerargyrite, chalcopyrite, and galena, associated with magnetite and hematite. Developed on 4 levels by 14,000 feet of adits, tunnels, drifts, and crosscuts. Large recorded silver production 1914-1938, mainly by cyanidation. Some copper and lead were recovered. (Burchard 84; Eakle 19:165-166; Eric 48:275; Sampson 40:145-146; Tucker 27:398-399; Whiting 88: 359-361)
	Silver Reef	J. G. Main, Benton	13	3S	30E	MD	Class D. Silver-gold-lead mine. Comprises 4 claims

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Silver Reef (continued)	(1940)					at 5900 feet elevation, 11 miles southwest of Benton on the east slope of the Benton Mountains. Two parallel veins 1 to 4 feet wide in limestone intruded by diorite are mineralized with argentite, galena, cerussite, and chloro-bromides of silver. Veins strike N 20°W and dip 60°W. Developed by 8 shafts, 50 to 200 feet deep, and 400 feet of drifts. Produced 1918-1920; smelter recovery averaged 2.72% lead, 114 ounces of silver per ton, and recoverable gold and copper. (Eric 48:275; Sampson 40:146; Tucker 27:399)
156	Tioga	Antionette S. Swift Lease to: Tioga Mining Company H. A. Yerkes, pres., N.Y.C. New York (1934)	19(?) 24	1N and 1N	25E 24E	MD MD	Class D, Type 2. Located at the headwaters of Leevining Creek, 12 miles west of Mono Lake, at an elevation of 10,600 to 11,000 feet. Quartz veins 6 to 40 feet wide in meta-sediments intruded by granite are mineralized with pyrite, chalcopyrite, sphalerite, galena, and bornite, associated with gold-silver. Developed by an adit driven S 30°W for 1800 feet in 1934. No known production. Owned by Great Sierra Mining Company 1877-1884. (Sampson 40:139; Whiting 88:371-372)
157	Topaz Lead-Silver	Topaz Lead-Silver Mines Company (1948)	28	10N	22E	MD	Class D, Type 2. Located on California Creek in the West Walker district. Developed by a 135-foot adit, 16-foot shaft and 24-foot tunnel. Produced complex sulfide ore 1947-1948; smelter recovery was 2.45% lead, 1.35% copper, and 7.35 ounces of silver per ton.
	Tower	S. D. Otey, Bishop (1940) Tom Buckley	3	3S	31E	MD	Class D Silver-gold mine. Comprises 2 patented claims on the west slope of Benton Mountains at an elevation of 6400 feet. A 2 to 4-foot quartz vein striking N 10E. and dipping 80W. in granite contains

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Tower (continued)	Benton (1941)					irregular lenses of pyrite, sphalerite, galena, and tetrahedrite. Developed by 300- and 200-foot shafts Reported production of $150,000. Small recorded production of silver in 1941. (Sampson 40:146; Tucker 27:399; Whiting 88:378-379)
	Twenty Grand	Joseph Smith and Dave McConnell Laws (1953) Operator: A. T. Wilkerson Bishop (1936)	14	5S	33E	MD	Class D. Gold mine. Comprises 10 claims between Coldwater and Piute Canyons, on the west slope of the White Mountains, 10 miles northeast of Laws at an elevation of 6500 feet. Quartzite and dolomitic limestone intruded by quartz monzonite is cut by a series of flat-dipping quartz veins 2 to 20 feet wide which are mineralized with gold associated with galena, cerussite, and iron oxides. Developed by a 600-foot adit, 120-foot adit, 40-foot adit, 60-foot inclined shaft, 40-foot incline with a 200-foot, 15-degree winze, a 200-foot adit,two 300-foot adits with 150 feet of cross-cut and drifts. Total underground development about 2000 feet. Shipped ore in 1936; smelter recovery was 9.45% lead, 1.26% copper, 1.89 ounces of silver per ton, and 0.25 ounce of gold per ton. Scheelite has recently been found in the intrusive on these claims. There is no record of the early gold production of this mine. (Eric 48:275; Sampson 40:139-140)
	West	Joe Conte, Laws (1933)	appr.	4S	32E	MD	Class D. Located in the Chidago district. Shipped gold-silver ore in 1933 containing recoverable copper and lead. (Eric 48:275)

MONO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Wild Rose	William Wagner, Big Pine (1919) Sam Morris, Bishop (1940)	19	2S	31E	MD	Class D. Gold-silver mine. Comprises 5 claims in Wild Rose Canyon, 6 miles southwest of Benton at an elevation of 7500 feet. A 4-foot quartz vein in granite is mineralized with pyrite, marcasite, galena, argentite, pyrargyrite, and gold. Developed by a 200-foot adit with 500 feet of cross-cut and drifts. Recorded production 1897, 1919 of about $12,000 in silver and gold. Lead not recorded. (Sampson 40:146; Tucker 27:399-400; Whiting 88:378-379)
	Unknown	L. Donahue, L. E. Babcock, Oasis, Calif.	appr.	3S	31E	MD	Class D, Type 1. Shipped ore from the Chidago district; smelter recovery was 8.15% lead, 10.82 ounces of silver, and 0.167 ounce of gold per ton.

MONTEREY COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Alisal Ranch		appr.	14S	5E	MD	Class D (?). Silver mine (?). Veins in granite (?) containing galena with silver, copper, and gold are reported worked in the early 19th Century. The location of the old shaft is a few miles east of Salinas. Production is not known. (Laizure 25:23, 56; Trask 1854:18; Waring 19c:615)
	New York	New York Mining Co., William Cruikshank, John Harboldt, James Trickle, Donald Lazier, and J. C. Lazier, Gonzales.	1	24S	5E	MD	Class D. Gold quartz mine near the summit of Ajax Mountain. Two narrow quartz veins enclosing an 18-inch crushed zone are mineralized with pyrite, arsenopyrite, chalcopyrite, galena, and gold. Developed by a 450-foot adit and several hundred feet of crosscuts. Operated 1903-1935 producing about 1300 tons of gold ore. Base-metal recovery is not reported. (Laizure 25:40-41)

NAPA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Calistoga						See: Palisade.
	Grigsby						See: Palisade.
	Grizzly		appr.	9N	7W	MD	Class D. Silver mine located about 260 feet higher than the Calistoga mine at 591 feet elevation. Ore assayed by Irelan, the State assayer, showed over 500 ounces of silver and 0.5 ounce of gold per ton. Minor base-sulfides are contained in the siliceous ores of this district. (Hanks 86:76-77)
	Ida Easley		appr.	9N	7W	MD	Class D. A silver-gold prospect above the Grizzly mine, in the Calistoga silver district. (Hanks 86: 76-77)
	Mt. St. Helena						See: Silverado.
	Palisade (Calistoga, Grigsby)	Vincent C. Harrison, Calistoga (1944) Operators: Banner Development Company, San Francisco, (1929-30) Coast Range Mining Company, 700 La Brea Avenue, Los Angeles (1935-38)	24	9N	7W	MD	Class D. Silver mine located 3 miles north of Calistoga at an elevation of 600 feet. Quartz veins in hydrothermally altered andesite are mineralized with silver sulfides, associated with gold, small amounts of copper and lead sulfides, and a trace of cinnabar. Ore is delicately banded and drusy, typical of epithermal deposition. Alteration of the wall rock and ore deposition appear to be mid-Tertiary in age. Production recorded for the periods 1888-90, 1925-41 (intermittent) is over 1,300,000 ounces of silver, 10,000 ounces of gold, 60,000 pounds of copper, and minor lead. Mine developed by a 300-foot vertical shaft, 1465 feet of adits and tunnels, and over 1000-

NAPA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Palisade (Calistoga, Grigsby) (continued)	Graham Loftus Oil Corp 811 West 7th Street Los Angeles (1938-41) Helena Consolidated Mines, Inc. (1941)					feet of drifts and crosscuts. (Averill 29:236, 237-238; Becker 88:370; Bradley 16:269-270; Castello 21:158-159; Crawford 94:376; 96:606; Crutchfield 53; Davis 48:183; Goodyear 88:413-415; 90:363; Hanks 85:93; 86:76-77)
	Silverado (Calistoga, Mt. St. Helena)	Harry Patten 234 Pine Street Calistoga (1929)	2	9N	7W	MD	Class D. Silver mine located 5 miles north of Calistoga on the southeast slope of Mt. St. Helena. A 4- to 12-foot quartz vein in hydrothermally altered andesite, strikes north and dips 73 degrees west. Ore and wall rock similar to Palisade. Developed by a 50-foot shaft and 100-foot drift. Produced 1948, a small tonnage of low-grade silver-gold ore. An early production of about $93,000 in gold-silver is reported. (Averill 29:238; Becker 88:370; Bradley 16:270; Castello 21:159; Crawford 94:376; 96:606; Goodyear 90:363; Hanks 86:76-77; Raymond 74:63-65)
	Venus		appr.	9N	7W	MD	Class D. Silver prospect. Mineralization similar to Palisade and Silverado. Ore assayed by Hanks in 1886 showed 2 to 4 ounces silver and 0.10 ounce gold per ton. No known production. (Hanks 86:76-77)

NEVADA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Alpine						See: Canada. (MacBoyle 19:116)
	Ancho-Erie Group	Ancho-Erie Mining Co. 401 - 2nd Street San Francisco (1949)	16,17, 20,21	18N	11E	MD	Class D. Gold mine. A total of 4 quartz veins about 4 feet in width, cut Blue Canyon meta-sediments about 1/2 mile west of the granite contact. Veins trend north and dip 60 to 70 degrees east. Developed by an 800-foot adit. Produced 1900-1949, intermittently. Large recorded gold production; mainly by direct recovery. Concentrates shipped in 1934 contained recoverable lead. (Logan 24:9; 30:101; 35:11; 41:382-383,444; MacBoyle 19:116-117)
	Arctic	Kemerer Exploration Company, Eureka, Utah (1941)	2 35	17N 18N	11E 11E	MD MD	Class D. Gold mine. A 3-foot and a 4-foot quartz vein in granite. Free gold associated with base-metal sulfides. Elevations on the property range from 3600 feet to 5267 feet at Arctic Point. Mine is developed by a 600-foot tunnel, 200 feet of drifts and 8 raises totaling 450 feet. Recorded production 1938 to 1941 of over 7800 tons of gold ore. Concentrates shipped contained recoverable copper and gold. (Crawford 96:235; Eric 48:276; Logan 24:9; 41:384-385, 444; MacBoyle 19:117-118)
158	Arkansas Traveler	H. C. Lewis North Bloomfield (1941)	13	15N	6E	MD	Class D, Type 2. One claim. Replacement body of pyrite, chalcopyrite, galena, sphalerite, gold and silver, along shear zone in altered diabase near its contact with granodiorite. Gangue minerals are quartz, epidote, and calcite. No known production. (Eric 48:276; Logan 41:444; MacBoyle 19:81-82)

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
159	Berkeley Prospect	J. W. Watson, L. W. Williams, Grass Valley (1918) Ronald Fraser, Post Office Box 424, Nevada City (1953)	6,7	16N	8E	MD	Class D. Type 2. Mine located about 8 miles northwest of Nevada City. Complex sulfide zone in altered diabase in Calaveras slate near contact with granodiorite. Width of zone about 6 feet; developed by a 60-foot shaft and short drift. Ore contains pyrite, chalcopyrite, chalcocite, sphalerite, gold and silver. Reported to have shipped ore in 1918 assaying 2.12% copper, 7% zinc, and $5.00 in gold-silver. An assay made by the present owner in 1953 showed the following: 0.10 ounce gold, 5.1 ounces silver, 1.30% copper, 9% zinc, 32% iron, 40% sulfur, minor antimony, arsenic, and calcium, and 6.8% insoluble. (MacBoyle 19:82)
	Boss (San Juan)	F. W. Bradley, 1022 Crocker Bldg., San Francisco (1943)	1,12 6,7	17N 17N	7E 8E	MD MD	Class D. Gold mine. A 2- to 12-foot vein in schist; strikes N, dips 80°E. Developed by a 200-foot vertical shaft, 800 feet of drifts and some diamond drilling. Produced 1934-36, 3377 tons of gold-silver-copper ore containing recoverable lead. (Aubury 08:201-202; Eric 48:277; Logan 41:446; MacBoyle 19:83-84)
	Canada Hill (Charronsnat, Lindley, North Grant, Alpine, Independence, St. Louis, Little Done)	R. W. Gaylord, Sacramento (1941) Operator: West Mines Corporation, Nevada City (1933-34)	17	16N	9E	MD	Class D. Gold mine. Comprises 8 claims, 2 miles east of Nevada City. A 16 to 18 inch vein dipping 20 degrees in granite is mineralized with free gold, pyrite, chalcopyrite, sphalerite, galena, arsenopyrite, and stibnite. Developed by a 1500-foot incline and over 6000 feet of drifts and crosscuts. Large recorded gold production. Base-metal recovery not recorded. (Crawford 96:238; Logan 35:11-12; 41:388-389, 447; MacBoyle 19:116, 132-133)

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
160	Carlyle Group (Carlisle, High Grade, Eagle)	Metal Products Corp. (1930)	3,4	17N	13E	MD	Class D. Type 2. A total of 24 claims in the Meadow Lake district on the south slope of Old Man Mountain at an elevation of 7450 feet. Veins 6 to 10 feet wide, striking N 48W , and dipping 80 degrees southwest in granite, are mineralized with auriferous pyrite, chalcopyrite, arsenopyrite, sphalerite and other minor sulfides. (Aubury 08:202; Eric 48:277; Logan 24: 359; 41:447, 453; MacBoyle 19:85)
	Champion	Carl P. Jones, Grass Valley (1935) E. J. Mooney, Nevada City (1939)	1 35	15N and 16N	8E 8E	MD MD	Class D. Gold mine. North trending, 2-foot quartz vein with a 35 to 40 degree dip to the east cuts slate and granodiorite. The milky quartz contains 6% sulfides; pyrite, chalcopyrite, galena, and sphalerite, with associated gold. Operated intermittently from 1888 to 1939 with a large recorded gold-silver production. During the years 1917-18, 10,000 pounds of copper and 38,000 pounds of lead were recovered also. (Crawford 94:187-188; 96:239; Eric 48:277; Goodyear 88:420; Hanks 86, pt. 2,47; Hobson 90:386-387; 93: 286-287; Logan 21:435-436; 30:103-104; 41:447; MacBoyle 19:135-143)
	Charronnat						See: Canada Hill.
	Dull						See: Empress.
	Empire Star Group	Empire Star Mining Company, Grass Valley (1954)	2,6 27,34 35	16N	8E	MD	Class D. Persistent gold producer since 1889. Gold occurs free and associated with pyrite, chalcopyrite, sphalerite, and galena in a quartz gangue in diabase

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Empire Star Group (continued)		2,3	15N	8E	MD	and granodiorite, along north-south and east-west fissures which divide the ground into a series of rhombohedral blocks. Underground workings are extensive; development in 1951 alone, was over 7000 feet of shafts. In recent years, annual production has been about 25,000 tons. Gold is recovered by amalgamation and cyanidation. Base-metal recovery not reported. (Crawford 94:189, 197; 96:242, 258; Eric 48:277; Hanks 86:46-47; Hobson 90:371-372, 373; 92:272-273, 284; Irelan 88:426-428,433; Johnston 40; Lindgren 96:97; Logan 21:436; 23:140; 30:105-110; 35:13; 41:392-397, 450; MacBoyle 19:154-162)
	Empress (Dull, Newton, Mulcahy)	Newton Mining Co. (1922-23) Empress Gold Mining Co. (1932-35) Republic Gold Mining Co. (1935-36) E. J. Rector Estate Nevada City (1939)	8,17	16N	8E	MD	Class C. Gold mine located 4 miles west of Nevada City. Developed by a 1000-foot inclined shaft and 6 levels of drifts. Recorded production 1936-1940 of about 80,000 tons of ore which was reduced to 2,000 tons of concentrates containing, in addition to gold-silver, 140,000 pounds of copper and 214,000 pounds of lead. Last operated in 1940 by Frank Sprout, Grass Valley. (Eric 48:277; Logan 23:140; 35:13; 41:397, 450)
	Giant King	Washington Giant King Mines Inc. Nevada City (1939)	13	17N	10E	MD	Class D. Gold mine. Originally 3 claims, $1\frac{1}{2}$ miles south of Washington at 3100 feet elevation. Slate and "porphyry" cut by quartz veins containing up to 3% sulfides including pyrite, chalcopyrite, and galena. Early development included 2 adits, one being 100 feet below the outcrop was driven 180 feet to the vein; the other was 254 feet below the outcrop and was driven 486 feet (prior to 1896). First recorded production

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Giant King (continued)						was in 1901 by W. L. Williamson of Washington. Later produced between 1936 and 1939, about 2800 tons of gold ore reduced to 102 tons of concentrates containing recoverable copper and lead in addition to gold-silver. Total development to 1939 was about 2500 feet of adits and crosscuts and 600 feet of raises. Base metal not reported. (Crawford 96:245; Eric 48:277; Logan 41:451; McBoyle 19:173)
	Golden Center	Cooley Butler, 744 Title Insurance Bldg. Los Angeles (1942-1952) Operator: R. N. Diggles and Stephen A. Little, P.O. Box 716, Grass Valley (1950)	27	16N	8E	MD	Class D. Gold mine located within Grass Valley City limits. A 1-to 3-foot quartz vein with free gold and up to 2% sulfides. Developed by a 1300-foot inclined shaft, a 1200-foot vertical shaft, and over 10,000 feet of drifts and crosscuts on 7 levels. Large recorded gold-silver production; also 35,000 pounds of copper and 15,000 pounds of lead as by-products. (Crawford 96:235; Eric 48:277; Logan 35:13-14; 41:400-401, 452; MacBoyle 19:177-180; Root 24:10, 179)
	Gracie						See: Gracie Glencoe.
	Gracie Glencoe (Gracie)	Gracie Mines Inc. Nevada City (1939)	18	16N	9E	MD	Class D. Gold mine located 1½ miles southeast of Nevada City. Developed by a 100-foot shaft with 460 feet of drifts, a 330-foot shaft with 500-foot tunnel and 345 feet of drifts. Recorded production 1935-1939 of 2448 tons of gold ore reduced to 134 tons of concentrates containing 1200 pounds of copper and 11,000 pounds of lead in addition to gold-silver. (Eric 48:278; Logan 30:113; 41:452; MacBoyle 19:183)

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Great Northern						See: Hoge.
	Green Mountain	Kistle Bros., 106 Pine Street, Nevada City (1936-40)	1 35	15N 16N	8E 8E	MD MD	Class D. Gold mine located about $2\frac{1}{2}$ miles southeast of Grass Valley, just south of the Orleans mine, on the same vein. Ore occurs as free gold and 3% sulfides including pyrite, sphalerite, and galena, in a quartz vein. Sulfide concentrates reported to assay about 3 ounces of gold per ton. Production from 1889 to 1940 was about 35,000 tons of ore; over 90% of the production was in 1906. Some lead and copper was recovered. (Eric 48:278; Hobson 92:285; Irelan 88:433; Logan 41:453)
	Hoge	Great Northern Gold Mines Inc. 301 Broad Street Nevada City	32 5	17N 16N	9E 9E	MD MD	Class D. Gold mine. Holdings comprise 280 acres, located $2\frac{1}{2}$ miles northeast of Nevada City. Two quartz veins about 2 feet in width trend east in granodiorite near slate contact. Gold associated with sulfides pyrite, arsenopyrite, and galena. Developed by a 1200-foot vertical shaft, a 600-foot inclined shaft and over 10,000 feet of drifts and cross-cuts. Produced 1929-1941 about 50,000 tons of gold ore reduced to 1600 tons of concentrates containing 2300 pounds of copper and 12,000 pounds of lead in addition to gold-silver. (Eric 48:278; Logan 35:15; 41:402-403, 453)
	Hussey (Hussey Ledge)	H. H. Hussey Nevada City (1941)	4	16N	9E	MD	Class D. Gold mine developed by shaft and about a thousand feet of drifts. Produced 1933-1935 about 6000 tons of gold ore reduced to 135 tons of concentrates containing 229 pounds of copper and 2642 pounds of lead in addition to gold-silver. (Eric 48:278; Logan 41:454)

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Idaho Maryland	Idaho Maryland Mines Corporation, 235 Montgomery Street, San Francisco (1954)	25,26	16N	8E	MD	Class D (?). Gold mine. System of rhombohedral fissure veins in diabase, serpentine, and schist intruded by granite. Same as the Empire Star except that the Empire Star and other mines in the district are all in the granodiorite. Free gold is associated with pyrite, chalcopyrite, galena, tellurides, and scheelite. Development to 1951 includes a 3450-foot vertical shaft, 2700-foot inclined shaft, 1000-foot vertical shaft, estimated 45 miles of drifts and crosscuts, and 11,650 feet of diamond drilling. Equipped with a 3300-ton ball mill. Estimated production of 1,500,000 tons of gold ore. Base metal recovery is only recorded for the period 1932-33 during which time about 20,000 pounds of copper and 10,000 pounds of lead were recovered. Annual production in recent years has exceeded 130,000 tons of ore. (Crawford 94:192; 96:251; Eric 48:278; Hamilton 22:31; Hobson 90:372-373; 92: 271-272, 283-284; Irelan 87:45-46; 88:425-426; Logan 21:436; 22:140; 23:73; 24:10, 179; 30:114-118; 35: 15-16; 41:403-407, 454; MacBoyle 19:185-191; Uren 01)
	Lava Cap	Lava Cap Gold Mining Company, Nevada City	16,21 28	16N	9E	MD	Class C. Gold mine located 5 miles southeast of Nevada City. Quartz veins in silicified argillite of Carboniferous age, cut by andesite and diorite dikes (premineral). Veins are near the contact with intrusive granodiorite. Freibergite and scheelite reported in the concentrates. Pyrite, chalcopyrite and galena are associated with the gold. Developed by an 1800-foot, 51-degree incline, a 2000-foot tunnel, over 10,000 feet of drifts, and about 14,000 feet of diamond drilling. Produced 1934-1943 about 978,000 tons of gold ore which was reduced to 50,000 tons of concentrates containing 236,000 pounds of copper and 258,000 pounds of lead in

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lava Cap (continued)						addition to gold-silver. (Chandler 41:409-425; Eric 48:278; Logan 35:13, 16-17; 41:456)
	Lindley						See: Canada Hill
	Little Done						See: Canada Hill
	Lone Pine	Carl Trevethick, Grass Valley (1940)					Class D. Gold mine developed by a 175-foot shaft and 220 feet of drifts. Produced 1939-40 about 547 tons of gold-silver ore containing recoverable copper and lead. (Eric 48:278)
	Lucky Joe	Al Ansel 404 Waller Street, San Francisco (1952)	20	17N	13E	MD	Class D. Gold mine located near the summit of Red Mountain. Small shipment of gold ore to Selby in 1952 containing recoverable copper and zinc.
	Midnight	L. J. Smith, Nevada City (1943)	appr.	16N	8E	MD	Class D. Small production of gold ore in 1943 containing recoverable lead.
	Mulcahy						See: Empress. (Eric 48:279)
	Murchie	American Foundation Company (1930) Empire Star Mines Company, Ltd. Grass Valley (1941)	8,9 16,17	16N	9E	MD	Class D. Gold mine located 2 miles east of Nevada City. Free gold associated with pyrite, galena, sphalerite, chalcopyrite, and silver tellurides. Developed by a 1150-foot vertical shaft, a 1650-foot, 85-degree incline, and several thousand feet of drifts. Recorded production 1905-1932 of about 158,000 tons of gold ore reduced to 3600 tons of concentrates containing 143,000 pounds of copper and 50,000 pounds of lead in addition to gold-silver.

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Murchie (continued)						(Crawford 96:250; Eric 48:279; Logan 30:118-119; 35:13; 41:458; MacBoyle 19:202-203)
	Newton						See: Empress.
	North Grant						See: Canada Hill.
	North Star	Empire Star Mines Co., Ltd. Grass Valley Formerly: North Star Mines Co. (1928)	2,3 27,28 34	15N 16N	8E 8E	MD MD	Class C. Gold mine. 1 to 3 foot quartz veins in an east-west zone, 2 to 4 feet wide in brecciated diabase near granodiorite contact. Developed by a 6376-foot inclined shaft, a 3500-foot vertical shaft and over 5000 feet of drifts. Operated 1889-1928; large recorded gold production, mainly by amalgamation and cyanidation. A shipment of 1112 tons of concentrates in 1919 contained 3180 pounds of copper and 222,000 pounds of lead in addition to gold-silver. (Crawford 94:195-196; 96:257; Eric 48:279; Hamilton 22:31; Hobson 90:376-378; 92:270-271; Irelan 87:44-45; 88:428-429; Logan 21:437-438; 22:140-141; 23:140; 24:10, 179; 30:121-127; 35:13; 41:460; MacBoyle 19:221-224)
	Orleans (Sultana)	Orleans Lode Mining Company, Nevada City (1936)	1 35	15N 16N	8E 8E	MD MD	Class D. Gold mine. A total of 27 claims $1\frac{1}{2}$ miles southeast of Grass Valley at an elevation of 2677 feet. The quartz vein which is a southern extension of the Empire vein is here split into stringers totalling about 8 inches over a 2-foot zone. Sulfides constitute 3% of the ore and assay about 3 ounces of gold per ton. The principal workings are in diabase; however, the granodiorite was reached in the deepest levels. Developed by a 650-foot shaft. Recorded production 1895-96, 1901, and 1936 of about 5200 tons of gold ore containing recoverable copper and lead in addition to gold-

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Orleans (Sultana) (continued)						silver. (Crawford 94:186, 258-259; 96:238, 242, 258; Hobson 92:280; Irelan 88:432-433; Lindgren 96:254-256; Logan 41:461; MacBoyle 19:226, 250-252)
	Patty Craney	Robert Wear Grass Valley	appr.	16N	8E	MD	Class D. Produced a small tonnage of gold-silver ore containing recoverable copper and lead.
	Queen Lil (Buffington)	R. Buffington Nevada City (1941) Lease to Yellow Tiger Mining Co Gordon Bettles, Mgr. Nevada City	11	16N	8E	MD	Class D. Gold mine located about 1 mile north of Nevada City. A 12 to 18-inch quartz vein in Calaveras quartz mica schist is mineralized with pyrite, galena, and gold-silver. Developed by a 230-foot vertical shaft and a 600-foot inclined shaft. Produced intermittently from 1916 to 1941, about 4600 tons of gold ore which was amalgamated and cyanided. Some concentrates were shipped containing recoverable copper and lead. (Eric 48:279; Logan 30:128; 41:462)
	Ragon	California Sierra Gold Mines, Inc. Nevada City (1937)	2	16N	8E	MD	Class D. Comprises 2 gold claims, 2½ miles west of Nevada City at 2700 feet elevation; a 4-foot quartz vein striking S, dips 45- degrees NE in granodiorite. Free gold associated with pyrite, chalcopyrite, and galena. Developed by a 400-foot, 30-to 50-degree incline and 500 feet of drifts. First discovered in 1856 while working an ancient gold-bearing channel. Last operated in 1935-37 when about 4000 tons of ore were milled. Recovery of base metal not recorded. (Crawford 96:260-261; Eric 48:279; Logan 35:12; 41:462; MacBoyle 19:238-239)

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Randolph						See: Western Merger. (Logan 30:130; 41:462)
	San Juan						See: Boss mine.
161	Spanish	Spanish Mining Company and San Francisco Commercial Company, F. W. Bradley, 922 Crocker Building, San Francisco (1943)	19,30 31	18N	11E	MD	Class B. Type 2. Mine located 21 miles northeast of Nevada City at an elevation of 4000 feet. Main adit is located 3 miles north of Washington in Poorman Creek. A 2- to 4- foot quartz vein in slate is mineralized with gold associated with sphalerite, galena, chalcopyrite, and bornite in a barite gangue. This mine, first discovered in 1883 was worked in 1893-1899, and 1931-1944. A large production of gold and silver has been recorded. The silver to gold ratio was high, 10 to 1. Of the base metals, the ratio of lead to copper to zinc was 2:1:1. Development consists of 9000 feet of adits and tunnels, 767-foot vertical shaft, 550-foot inclined shaft, 4000 feet of drifts, and 3000 feet of crosscuts. Barite has also been produced. (Eric 48:280; Logan 30:128-129; 41:264; MacBoyle 19:249)
	Spanish		1(?)	16N	8E	MD	Class D. Gold mine located near Woode Ravine, $1\frac{1}{4}$ miles northwest of Nevada City at 2500 feet elevation. A 3-foot quartz vein in granodiorite strikes NW and dips 42 NE. Gold is associated with pyrite, chalcopyrite, and galena. Developed by a 220-foot, 42-degree incline, 600-foot drainage tunnel 120 feet below the outcrop, and a 225-foot adit 270 feet below the outcrop. No record of production. (Crawford 94:20; 96:264; Hobson 92:292-293; Irelan 88:149)

NEVADA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	St. Louis						See: Canada Hill. (Logan 41:388-389)
	Sultana						See: Orleans. (Logan 41:461)
	Western Merger (Randolph)	A. W. Davis Nevada City (1940) Lease to: A. A. Codd, Reno, Nevada (1926)	SE¼ 32	17N	9E	MD	Class D. Gold mine located 3 miles from Nevada City on North Columbia road. A 10- to 12-inch vein of dark glassy quartz in granodiorite is mineralized with pyrite, marcasite, chalcopyrite, galena, and free gold. Developed by a 400-foot shaft, and 2000 feet of drifts and crosscuts. Produced 1928-1940, intermittently, about 2489 tons of gold ore which was reduced to 109 tons of concentrates containing recoverable copper and lead in addition to gold-silver. (Eric 48:279; Logan 30:130; 41:462, 467)
	Unknown	Jordan and Glennan, Colfax (1945)	appr.	16N	8E	MD	Treated 1086 tons of old tailings containing recoverable copper and lead in addition to gold-silver.

ORANGE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
162	Blue Light (Silverado)	Blue Light Mines Corp. 508 Chapman Bldg. Anaheim (1944)	11,14	5S	7W	SB	Class B, Type 1. Comprises 13 claims in Silverado Canyon, 20 miles east of Orange. Veins 2 to 6 feet wide in metamorphic rocks are mineralized with argentiferous galena, sphalerite and pyrite. Developed by more than 2000 feet of tunnels, drifts, and raises. Produced 1906-1907, 1920-1929, 1936-1946. Developed in 1943 by an R.F.C.A. loan. The average smelter recovery from ore shipped has been 4.15% zinc, 1.97% lead, 15.32 ounces of silver per ton, and 0.033 ounce of gold per ton. (Eric 48:241; Tucker 24:43-45; 25:63-64; 43:122, 123)
	Morrow Group						See: Wilhunt. (Tucker 25:64; 43:124, 125)
163	Old Dominion (Ortego)	Ortego Mining Co. V. B. Anderson, Earl Frevert, 117 Spurgeon St., Santa Ana (1943)	7	6S	5W	SB	Class D, Type 1. A total of 640 acres, patented, at the head of Long Canyon, 6 miles west of Elsinore at an elevation of 3400 feet. Veins 6 to 8 feet wide in metamorphic rocks near granite contact are mineralized with pyrite, galena, sphalerite, and silver. A shipment of ore was made in 1942; smelter recovery was 5.12% lead, 26.24 ounces of silver per ton, and recoverable copper. Earlier production unknown. (Eric 48:281; Tucker 25:64; 43:123-124)
	Ortego						See: Old Dominion. (Tucker 43:123-124)
	Silverado						See: Blue Light. (Tucker 43:122-123)

ORANGE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
164	Wilhunt (Wilhunt Lead-Silver, Morrow Group)	L. S. Hunter, 4382 San Marino Street, Los Angeles (1942) Operators: Santiago Mining Co., Orange (1896-97) W. S. Morrow, Orange (1916-1935)	27	5S	6W	SB	Class D, Type 1. Five claims in Santiago Canyon, 9 miles northeast of El Toro. Veins 1 to 3 feet wide in diorite, quartzite, and slate, are mineralized with galena, sphalerite, and pyrite; some antimony also reported in the ore. Developed by 400 feet of drifting. The only record of production was a shipment made in 1919; smelter recovery was 8.20% lead, 20 ounces of silver per ton, and 0.10 ounce of gold per ton. (Merrill 19:516; Tucker 25:64; 43:124, 125)
	Yaeger	Jacob Yaeger Fullerton (1925)	2,3	6S	6W	SB	Class D. Comprises 15 gold claims at 3000 feet elevation at the head of Trabuco Canyon on the southwest slope of the Santa Ana Range, about 17 miles east of El Toro. Four parellel quartz veins 1 to 10 feet wide occur along faults in quartzite, slate, and granite. Ore minerals are pyrite, chalcopyrite, sphalerite, and galena, with gold and silver. Developed by over 3000 feet of adits. No known production. (Tucker 25:62)

PLACER COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Alabama	Alabama California Gold Mines Company Auburn (1942)	35	12N	7E	MD	Class C. Gold mine located 1 mile east of Penryn. Quartz stringers in gabbro-diorite mineralized with free gold and tellurides associated with pyrite, chalcopyrite, galena, and argentite in a partially oxidized deposit. Developed by a 500-foot shaft with 5000 feet of drifts, a 205-foot shaft, and about 2000 feet of diamond-drilling. Recorded production 1933-1942 of about 417,000 tons of gold ore which was reduced to about 3400 tons of sulfide concentrates containing about 25% of the gold value and nearly all of the silver. The silver to gold ratio was about 3 to 1. Recoverable base-metal in the concentrates was 2.30% lead and 0.65% copper. (Eric 48:281; Logan 35:17; 36:10-11)
	Auburn-Chicago (Chicago)	Auburn-Chicago Mining Company Auburn (1938)	35,36	12N	7E	MD	Class D. Gold mine located 1 mile east of Penryn. A 2- to 3-foot quartz vein in granodiorite is mineralized with gold associated with sphalerite, galena, chalcopyrite and pyrite. Sulfides constitute about 1% of the ore. Developed by 2 inclined shafts with about 6000 feet of drifts, raises and winzes on three levels. Produced continuously 1933-1938 about 32,000 tons of gold ore which was reduced to about 600 tons of concentrates containing about 30% of the gold, all of the silver and recoverable copper and lead. (Eric 48:281; Logan 27:250; 35:17-18; 36:16-17, 42; Tucker 19:337)
	Auburn-Pacific	Auburn-Pacific Mines, Inc. Auburn (1937)	12	12N	7E	MD	Class D. Gold mine located 6 miles southeast of Newcastle. Developed by a 400-foot vertical shaft and 500 feet of drifting. Produced 1936-37 about 3700

PLACER COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Auburn-Pacific (continued)						tons of gold ore which was reduced to 74 tons of concentrates containing recoverable copper and lead in addition to gold-silver. (Eric 48:281)
	Big Pine (T.W.A.)	A. N. Sweet, Auburn (1935) Hall Livingston, Auburn (1942)	16	12N	8E	MD	Class D. Gold mine located 2 miles southwest of Auburn in the Ophir district. Mine developed by a 400-foot vertical shaft and 1000 feet of drifts; Equipped with a 30-ton flotation mill. Produced about 5300 tons of gold ore which was reduced to 64 tons of concentrates containing recoverable lead and copper in addition to gold-silver. Sulfides were encountered at a depth of 170 feet. The vein averaged about 18 inches in width. (Eric 48:281; Logan 36:39)
	Blue Eagle (June Bug)	H. Livingston, Auburn (1939)	E½ of SE¼ 18	12N	8E	MD	Class D. Gold mine located 3 miles west of Auburn. Developed by a 135-foot, 45-degree incline and about 300 feet of drifts and crosscuts. Produced 1935-1939, about 613 tons gold ore which was reduced to about 17 tons of concentrates containing recoverable copper and lead in addition to gold-silver. The vein averaged about 18 inches in width. Gold was mainly in the sulfides, pyrite, chalcopyrite, and galena. (Eric 48:282; Logan 36:14-15)
	Buttes						See: Hathaway. (Logan 36:26)
	Chicago						See: Auburn-Chicago. (Logan 36:17-18)

PLACER COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Eclipse Consolidated	Ophir Nevada Mining & Milling Company Auburn, (1940)	NW$\frac{1}{4}$ 17	12N	8E	MD	Class D. Gold mine located $2\frac{1}{2}$ miles west of Auburn. A total of 7 quartz veins, maximum width 6 feet, striking east and dipping 30 to 45 degrees south in granodiorite and schist, are mineralized with gold associated with galena, sphalerite, and chalcopyrite. The mine was located by the presence of a prominent gossan. Developed by a 140-foot adit and 3 short raises. Produced 1889-1906 and 1934-1940. During the last period of operation about 9000 tons of ore were mined and reduced to 100 tons of concentrates containing recoverable lead and copper in addition to gold-silver. The silver to gold ratio was less than 1 to 1. (Aubury 08:207; Crawford 96:277; Eric 48:282; Hobson 90:433; Logan 36:22, 44; Tucker 19:338)
	Gold Blossom	St. Patrick Mining Co. A. L. Merritt 200 Bush Street San Francisco (1937)	12	12N	7E	MD	Class D. Gold mine located 4 miles west of Auburn. Two quartz veins 2 to 3 feet wide in granodiorite are mineralized with gold associated with pyrite, arsenopyrite, argentiferous galena, sphalerite, and chalcopyrite. A diorite dike forms the hanging wall of the Gold Blossom vein and an amphibolite dike the hanging wall of the Marion vein. Both veins strike east and dip steeply south. Developed by a 400-foot vertical shaft and 400 feet of drifts in 1937. Old workings not known. Produced 1889-1907 about 10,000 ounces of gold and 6000 ounces of silver. Last operated in 1937 when about 1610 tons of low-grade ore was cyanided. Base-metal recovery not recorded. (Crawford 94:209; 96:278-279; Hobson 90:431, 433; Lindgren 94:270; Logan 36:23-24, 45)

PLACER COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Gold Dike	H. H. Marsh 415 Mill Street Grass Valley Lease to: J. D.Leedy 3816 Eastern Avenue Seattle, Washington	lots 21,22 in sec.5	15N	13E	MD	Class D. Gold mine located in the Canada Hill district. Quartzite and slate of the Blue Canyon formation are intruded by greenstone dikes and cut by quartz stringers up to 18 inches in width. Gold is associated with pyrite and galena. Developed by a 108-foot shaft and and 670 feet of drifts. Produced intermittently between 1932 and 1940 about 390 tons of gold ore. Base-metal recovery not reported. (Logan 35:18; 36:24-25)
	Hathaway (Buttes)	John E. Noia Newcastle (1936) Operator: Hathway Consolidated Gold Mining Company	18	12N	8E	MD	Class D. Gold mine located about 1/2 mile southwest of Ophir. A 2- to 4-foot quartz vein in amphibolite schist and granodiorite is mineralized with gold associated with pyrite, spalerite, galena, chalcopyrite, and arsenopyrite. Sulfides constitute 2% of the ore. Outcrop length is 1200 feet. Developed by a 837-foot shaft with 5000 feet of drifts. No known production. (Crawford 96:280; Hobson 90:429-431; Logan 36:26, 45; Tucker 19:341)
	Highway Forty	Highway Forty Mines, Inc. Sacramento (1942) Marvin R. Fleming Auburn (1947)	appr.	12N	8E	MD	Class D. Gold mine. Produced 1940-1942 and in 1947 a total of about 1800 tons. Lead and copper were recovered as a by-product from concentrates shipped to smelters. (Eric 48:283)
	June Bug						See: Blue Eagle.

PLACER COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Kilaga Springs						See: Valley View.
	Major	Major Bros. Newcastle (1914)	appr.	12N	8E	MD	Class D. Small production in 1913-14 of gold-silver ore containing 5.76% lead and 4.26% copper. (Eric 48:283)
	Oro Fino	Mrs. Hazel P. Gridley Auburn (1936) Operators: Oro Fino Consolidated Mines, 181 Bush Street San Francisco (1943)	7,8	12N	8E	MD	Class D. Gold mine located 4 miles west of Auburn. A quartz vein in granodiorite and amphibolite schist striking northwest and dipping 65 degrees south is mineralized over a maximum width of 2 feet by free gold associated with pyrite and galena. Sulfides constitute about 1% of the ore. Developed by an 860-foot, 72-degree inclined shaft with 8 levels at 100-foot intervals and about 6000 feet of drifts. Large recorded gold production 1914-1922, 1935-1943; mainly by cyanidation. Base-metal recovery not reported. (Crawford 96:274; Eric 48:283; Hamilton 22:32; Logan 21:445-446; 22:7; 27:251; 36:30-31,46; Tucker 19:345-346)
	St. Lawrence		7	12N	8E	MD	Class D. Gold mine. A 1-to 2-foot vein striking east, dipping 20 to 45 degrees south is mineralized with gold associated with pyrite, galena, and stibnite in a gangue of glassy quartz. Both walls are granodiorite. A diorite dike occurs in the hanging wall near the vein. Developed by a 300-foot shaft with 2 connecting tunnels. Production not known. (Crawford 94:212; 96:286; Irelan 88:461-462; Logan 36:36-37, 47)

PLACER COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sisley	Burm-Ball Mining Co., Auburn (1939)	26	12N	7E	MD	Class D. Gold mine located $1\frac{1}{2}$ miles west of Auburn. Developed by a 500-foot vertical shaft, 2998 feet of drifts, and 590 feet of crosscuts. Equipped 1938 with a 100-ton flotation mill. Produced 1936 to 1939 about 11,700 tons of gold ore which was reduced to 59 tons of concentrates containing recoverable lead and copper in addition to gold-silver. The silver to gold ratio was about 4 to 1. (Eric 48:283)
	T.W.A.						See: Big Pine.
	Two Orphans Prospect	B. A. Fredericks Auburn (1936) Stephen Kutchar Rio Linda (1942)	NW$\frac{1}{4}$ of 30	13N	8E	MD	Class D. Gold mine. Two quartz veins 14 to 18 inches wide in greenstone strike northwest and dip 54 degrees east. Sulfides associated with gold are pyrite, chalcopyrite, and galena. Developed by a 100-foot inclined shaft with 150 feet of drifts, and a series of prospect shafts along the strike for 1500 feet. Produced 1936-1942 about 1225 tons of gold ore which was reduced to 23 tons of concentrates. Recovery was mainly by cyanidation. (Eric 48:283; Logan 36:39, 48)
165	Valley View (Harpending, Kilaga Springs, Whiskey Diggins, Whiskey Hill)	J. B. Landis and Goodwin M. Trent, Auburn (1943)	12,13 24	13N	6E	MD	Class D, Type 2. Copper mine located 6 miles northwest of Lincoln. A 100-foot andesite dike, striking N 80° W. and dipping 72° NE in schist, is mineralized with pyrite, chalcopyrite, sphalerite, gold, and native silver. Minor galena is present also. The gossan was 100 feet wide and extended in depth 100 feet where sulfides were encountered. Gold and copper values decreased and zinc

PLACER COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Valley View (continued)						increased with depth. Developed by 130-foot, 180-foot, and 280-foot shafts. There were 3 periods of production, 1912, 1917 and 1942-43. Ore shipped in 1912 averaged 6% copper, 0.312 ounce of gold and 0.645 ounce of silver per ton. Shipments during 1917 averaged 3.74% copper, 0.161 ounce of gold, and 1.71 ounces of silver per ton. Ore shipped during the last period of operation showed a smelter recovery of 1.37% copper, 0.19 ounce of gold, 2.18 ounces of silver per ton, and recoverable lead. Zinc was not reported by the copper smelter. (Aubury 05:174; 08:208; Averill 43C:558; Eric 48:283; Graton 07:395; Knopf 06:415; Lang 07:264; Logan 27:246-247; 36:40; Pabst 38:29; Silliman 68:93-95)
	Victory	J. E. Johnson, H. E. Laufek, Reno, Nevada (1934) Operators: Victory Mine Company, Coloma (1948)	SE$\frac{1}{4}$ SE$\frac{1}{4}$ 13	15N	9E	MD	Class D. Gold mine in the Iowa Hill district. Gossan worked for gold-silver. Silver to gold ratio was $3\frac{1}{2}$ to 1. Sulfides encountered at 100 feet were pyrite, chalcopyrite, and galena which occur in lenses in Cape Horn slate interbedded with a schistose intrusive. Vein strikes north and dips 72 degrees east and is faulted by a N 40W fault which dips 45 degrees southwest. (Logan 35:18-19; 36:40-41, 48)
	Unknown	R. H. Nelson, Auburn (1943)	appr.	12N	8E	MD	Class D. Gold-silver prospect (?). Small production from the Lincoln district in 1943; smelter recovery was 2.07% lead, with minor copper and silver. Gold not reported. (Eric 48:281)
	Unknown	Ward & Ward (1941)	appr.	12N	8E	MD	Class D. Shipped high-grade gold-silver ore in 1941 containing recoverable lead and copper. (Eric 48:251)

PLUMAS COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	B & M Mining	H. E. Bush, Taylorsville, (1915)					Class D. Silver prospect (?). Small production in 1915; smelter recovery was 20% lead, 45.80 ounces of silver per ton, and 0.027 ounce of gold per ton.
166	El Dorado Group	Paul Sogonini, L. Dufay, Chilcoot (1918)	25	24N	16E	MD	Class D. Type 2. Five claims at 6100 feet elevation, on ridge east of Last Chance Creek about 8 miles north of Chilcoot. Discovered in 1909; developed by a 60-foot crosscut tunnel which cut the vein 50 feet below the outcrop. A drift to the east followed the vein for 155 feet. The deposit consists of a series of quartz fissure-veins with a maximum width of 4 feet. Country rock is granite. Ore minerals are chalcopyrite, bornite, and galena. Only recorded production was a small shipment of ore in 1915 containing 5.56% lead and 2.23 ounces of silver per ton. (Averill 27:129; Eric 48:286; MacBoyle 20a:55,180)
167	Engels	Engels Mining Company, 364 Mills Building, San Francisco	3,4, 5,8, 9,10,	27N	11E	MD	Class D. Type 2. Large copper producer. Ore minerals are chalcopyrite, bornite, and chalcocite with minor sphalerite, galena, enargite, and tetrahedrite, associated with magnetite and ilmenite. Ore occurs in a breccia and in fissures at contact of gabbro-norite and quartz diorite. Theories on genesis of this deposit are conflicting and literature is voluminous; see Eric 48:286 for complete bibliography.
			32,33, 34	28N	11E	MD	
	Fall River	W. P. Frick, 212 Easton Building, Oakland (1936)	24	21N	7E	MD	Class D. Gold mine located 9 miles west of La Porte in the Granite Basin district. Comprises 2 claims on Fall River at an elevation of 4500 feet. Early production unknown. Concentrates produced in 1938 from 30 tons of gold ore contained recoverable lead in addition to gold-silver.

PLUMAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Fall River (continued)	Operators: J.C. Wolters, Gibsonville (1896) Fall River Mining Co. Feather River (1938)					(Averill 37:130; Crawford 94:216: 96:293)
	Gold Leaf	A. G. Fraser, Quincy (1924) Dr. H. D. Look, Box 23, Spring Garden (1937)	29,30 19,20	24N	11E	MD	Class D. Gold mine. Comprises 7 patented claims, 122 acres, in the Genesee district. Quartz veins 2 to 20 feet wide in Calaveras slate outcrop for 600 feet along strike. Gold-silver is associated with galena in a siliceous gangue. Developed by a 100-foot vertical shaft, an inclined shaft, tunnels, and several open cuts. Equipped in 1924 with a 20-ton cyanidation plant. Recorded production 1909-1939 intermittently of about 3100 tons of low-grade gold ore containing recoverable lead. (Averill 28:287; 37:131; MacBoyle 20a:119-120)
	Jamison (Carnation)	George Frasher, Blairsden (1947)					Class D. Gold mine in the Johnsville district; elevation 5370. Gold associated with galena in 2 quartz veins about 10 inches wide in gabbro. First discovered in 1888. Developed by a 165-foot vertical shaft, 1800-foot drainage tunnel, 4817 feet of drifts and crosscuts. Produced over 75,000 ounces of gold by cyanidation mostly before 1925. Some lead was recovered in concentrates shipped. (Averill 28:293; 37:112,132; Crawford 94:217; 96:298; Irelan 88:481; MacBoyle 20a:136; Preston 90d:483; 93c:330)

PLUMAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Indian Valley	J. W. Prentiss, 42 Broadway, N.Y.C. New York	10,11	26N	9E	MD	Class D. Gold mine. A 6 to 18-inch quartz vein in meta-rhyolite, strikes NW and dips steeply, is mineralized with free gold associated with pyrite and galena. No known production. (Crawford 96:298; Logan 37:109-110, 132; MacBoyle 20a:134; Preston 90:473)
	Lakin	Lee Lakin, Blairsden (1941)	24	22N	11E	MD	Class D. Gold mine. Produced 1937-1941, intermittently, about 450 tons of gold ore containing 2270 pounds of lead in addition to gold-silver.
	Lucky S	Ora Plata Mining Corp. R.O. Fife, 8707 Santa Monica Blvd., Los Angeles (1936) Operator: A.A. Herraman, Taylorsville (1941)	28,33	27N	11E	MD	Class D. A total of 4 gold claims, 10 miles northeast of Taylorsville at an elevation of 6500 feet. A 6-inch quartz vein is mineralized with gold associated with pyrite, chalcopyrite, sphalerite, and galena. Recorded production 1895 to 1907 and in 1941. Base-metal not reported. (Averill 28:290; 37:113, 133; Crawford 96:300; MacBoyle 20a: 141; Preston 90:467)
	Morning Star						See: Robinson.
	Ora Plata						See: Lucky S
	Ohio	Virgilia Mining Corp., Virgilia, Calif. (1942)	19	24N	11E	MD	Class D. Gold mine in the Genesee district; developed by a 200-foot vertical shaft, 4000 feet of drifts, 900-foot tunnel, and 300 feet of raises. Recorded production 1928 to 1942 of about 260,000 tons of gold ore which was reduced to 15,000 tons of concentrates from which by-product copper and lead were recovered. (Eric 48:288)

PLUMAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Plumas-Eureka	Plumas-Eureka Mines, Inc., 1625 Van Ness Avenue., San Francisco (1937) Tech. Porcelain Chinaware Co., Johnsville (1947)	26	22N	11E	MD	Class D. Gold mine located 4 miles southeast of Blairsden. Two quartz veins, 1 to 20 feet wide, near contact of quartz-porphyry and gabbro, are mineralized with gold associated with pyrite, arsenopyrite, chalcopyrite, and galena. This mine, first discovered in 1880, is developed by 7300 feet of adits and a 100-foot shaft. Reported production of over 1,000,000 tons of $8.00 ore. Some concentrates have been shipped containing about 23,000 pounds of lead and a little copper. (Averill 28:292, 293; 37:118-119, 135; Crawford 94:219; 96:303; Eric 48:289; Irelan 88:476-479; MacBoyle 20a:155-157; Preston 90:482; 92:330)
	Rainbow	A. L. Allen, Feather Falls (1937)	25	22N	7E	MD	Class D. Two gold claims near Cascade. A 2-to 7-foot quartz vein striking east and dipping 68° south in amphibolite (?), is mineralized with free gold in association with pyrite, chalcopyrite, galena, and sphalerite. Developed by a 43-foot inclined shaft. No recorded production. (Averill 37:120-121, 136)
	Robinson (Morning Star, Trenton, Granite Basin)	E. C. Robinson 1117 Financial Center Oakland (1939)	30,31	23N	7E	MD	Class D. Comprises 50 gold claims. Five parallel fissures within a width of 100 feet at amphibolite and granite contact, are mineralized with gold in association with galena and chalcopyrite. Produced 1936 to 1939, about 5550 tons of gold ore which was reduced to 52 tons of concentrates containing 2,064 pounds of copper and 10,568 pounds of lead in addition to gold-silver. (Averill 37:136; Crawford 96:304; Eric 48:289)

PLUMAS COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
168	Superior	Engels Copper Company 364 Mills Bldg. San Francisco, Calif.	15,16 17,18 19,20	27N	11E	MD	Class D, Type 2. Large copper producer; production probably combined with Engels. Six veins in quartz monzonite are mineralized with chalcopyrite, chalcocite and bornite with minor tetrahedrite, galena, and sphalerite, in a gangue of quartz, magnetite, ilmenite, tourmaline, epidote, and biotite. (Eric 48:290; Knopf 35: 245; see also Engels)
	Trenton						See: Robinson
169	Walker	Walker Mining Co. 818 Kearns Blvd. Salt Lake City, Utah	5,6,7, 8 29,30,	24N	12E	MD	Class D, Type 2. Large copper producer. Shear zone in meta-sediments and meta-volcanics of Carboniferous age, is mineralized with chalcopyrite, cubanite, and pyrrhotite, with minor sphalerite, galena, tetrahedrite, stibnite, jamesonite, and free gold, in a gangue of magnetite, quartz, garnet, andalusite, cordierite, barite, and chlorite. Outcrops above ore were very barren, showing only silicification and some barite. No record of lead or zinc recovery. (Averill 37:95-99, 135; Eric 48:290; Ewing 27; Knopf 35:241-245; MacBoyle 20a:63, 64; Mining World 42:39; Neale 26:554-556; Rand 31:685-686)
		G. M. Boyles, Portola (1950)	31,32	25N	12E	MD	
	Unknown	C. W. Nugin Butt Valley (1941)	appr.	26N	7E	MD	Class D. Gold mine in the Seneca district. Produced gold-silver ore in 1941 containing 5.64% lead and recoverable copper in addition to gold-silver. (Eric 48:284)
	Unknown	H. Michaels Company Greenville (1942)	appr.	26N	9E	MD	Class D. Gold mine in the Greenville district. Small production of gold-silver ore in 1942 containing recoverable copper and lead. (Eric 48:284)

RIVERSIDE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bald Eagle	Dan Figuerero & Sons, Rt. 1 Box 8, Blythe Lease to: Ben Tyrrell, 30 West Weber Street, Stockton and William Nemie, 1412 East Washington Street, Stockton (1953)	appr.	4S	21E	SB	Class D, Type 1. Mine located 3 miles east of Midland on the Santa Maria Range. Produced 1950-51; smelter return on shipments averaged 14.35% lead, 6.16 ounces of silver per ton, and recoverable copper, zinc, and gold.
170	Black Eagle	W. S. Horner, Box 1135, Indio (1952) Former Operators: Imperial Metals Inc., Mecca Mines Inc., 811 West Seventh St., Los Angeles (1945)	25	3S	13E	SB	Class B, Type 1. Comprises 7 patented and 3 unpatented claims in the Eagle Mountain. Two 6-foot veins along contact between quartzite and diorite are mineralized with galena and some chalcopyrite. Developed by a 550-foot vertical shaft, 2700 feet of drifts, and 750 feet of raises. Produced 1939-1950, and in 1952 both ore and concentrates. Smelter recovery has averaged about 7.58% lead, 3.08 ounces of silver, 0.4% copper, and some gold. (Eric 48:291; Tucker 45:146-147; 24:193-194; 29a; 474-475; 38:14; 40:47)
	Brannigan						See: Brooklyn-Los Angeles.

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Brooklyn-Los Angeles (Brannigan)	Brooklyn Mining Co. Highland, Calif. (1941) Lease to: Dewey Cambell San Bernardino (1941)	1	2S	12E	SB	Class D. Group of 15 gold claims in the Dale district at an elevation of 2000 feet. Series of 5 parellel quartz veins 2 to 6 feet wide, striking NW, dipping 70°NE in granodiorite and diorite, contain gold associated with galena and chalcopyrite. Total underground workings about 8500 feet including 17 shallow shafts, tunnels and drifts. Equipped with a 60-ton cyanidation plant in 1940. Recorded production 1931-1941, intermittent, about 3000 tons of gold ore containing recoverable copper and lead. (Eric 48:291; Tucker 31:289-290; 34:321)
	Cap Hunter	Roy M. Berg Box 478 Desert Center (1951)	appr.	6S	15E	SB	Class D, Type 1. Made a small shipment of ore to Wickenburg in 1951; smelter recovery 15.8% lead, and 5 ounces of silver per ton.
	Chuckwalla and Model Group	Chuckwalla Development Co., Los Angeles (1935) Frank Czerwonka Desert Center (1941)	31,32	6S	16E	SB	Class D. A group of 15 gold claims, 8 miles south of Desert Center at an elevation of 2000 feet. Several parallel quartz veins, 4 to 8 feet wide, strike north and dip 60 degrees east in gneissoid granite. Ore minerals are pyrite, chalcopyrite, galena, and free gold. Azurite and malachite are common in the oxidized zone. The mine is developed by several 25- to 50-foot shafts; also adits. Production of gold ore containing recoverable lead and copper in 1902, 1934-1941. (Eric 48:292; Tucker 45:129)
171	Corona Lead-Zinc	Joe Smith Temecula and	14	4S	7W	SB	Class D, Type 1. Five claims, 4½ miles south of Corona at an elevation of 1600 feet. A 2- to 6-foot vein striking NE, dipping 45° NW, in meta-sediments is mineralized with argentiferous galena, sphalerite, and pyrite. Wall rock adjacent to vein is also mineralized.

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Corona Lead Zinc (continued)	Fred Spiess Corona Lease to: Corona Lead-Zinc Co. Victor Mishelle, pres. West Los Angeles (1945)					Ore reported to contain 10% lead, 14% antimony, and 40 ounces of silver. Development consists of a 360-foot open cut and a 92-foot adit. Production not determined. (Tucker 45:147-148)
	Desert Center	S. A. Ragsdale Desert Center	35	6S	17E	SB	Class D. Gold-silver mine (?) Chuckwalla Mountains, about 8 miles south of Desert Center. A 3-foot vein striking east, dipping 30 degrees south in granite, is mineralized with argentiferous galena and some free gold. The vein is adjacent to a basic dike. Worked by a 75-foot crosscut tunnel with a 20-foot drift along the vein; also a 25-foot shaft. Small recorded production of gold-silver in 1940; base-metal recovery not reported. (Tucker 29:491; 45:148)
	El Plomo						See: Victor.
	Gavilan						See: Ida-Leona. (Sampson 35:508-509)
	Golden Key	E. Swanson, Blythe (1937)	appr.	6S	16E	SB	Class D. Gold mine in the Chuckwalla district. Developed by a 55-foot shaft, 20-foot tunnel, 45 feet of drifts, and a 5-foot by 20-foot open cut. Gold-silver ore produced 1934 to 1937 also contained 1.77% lead and recoverable copper. (Eric 48:292)

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Gold Galena	F. C. Longnecker 6016 Romaine Avenue Los Angeles	4,8,9	3S	9E	SB	Class D. Vein containing gold and galena; developed by a 70-foot shaft. No recorded production. (Merrill 19:538; Tucker 45: map)
	Gold Rose	Associated Mines & Milling Company Dale R. Holmes and Herbert C. Oehl, 462 Mt. View Ave. San Bernardino (1951)	appr.	2S	12E	SB	Class D. Gold concentrates from about 400 tons of ore milled in 1951 were shipped to Selby and Miami. Minor copper and lead were recovered in addition to gold-silver. This mine formerly thought to be in San Bernardino County is located in the Dale district, Los Angeles Wash. (Tucker 30:238; 31:298-299; 40:67; 43b:453, pl. 7; Wright 53: pl. 39)
	Ida Leona (Gavilan)	Ida-Leona Mining Co. c/o H. L. Nelson, Perris (1945)	19,20	4S	4W	SB	Class D. Gold mine comprises 360 acres, in the Pinacate district, 6 miles northwest of Perris at 2200 feet elevation. Two systems of quartz veins, 1 to 4 feet wide in granite cut by muscovite-tourmaline-bearing pegmatite dikes, are mineralized with free gold associated with pyrite and galena. Developed by a 350-foot shaft and 700 feet of drifts. Recorded production of 3000 tons of gold ore 1936 to 1942. Base-metals not reported. (Crawford 96:311, Merrill 19:528; Sampson 35:508-509; Tucker 29:478; 45:135-136)
	Lead King	P. E. Gates Los Angeles (1949)	appr.	6S	16E	SB	Class D, Type 1. Chuckwalla district. Small shipment to Wickenberg in 1949; smelter recovery 24.8% lead and 7 ounces of silver per ton.

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Long Shot No. 1	Edward W. Rowe, Rice, California (1951)	appr.	3S	13E	SB	Class D. Type 1. Ironwood district. Small shipment to Wickenburg in 1950; smelter recovery was 11.5% lead, 7.26 ounces of silver per ton, and 0.25 ounce of gold per ton.
	Louise	Einar J. Evans, Twentynine Palms (1939) E. Bethurum, Rt. 1, Box 184, Perris (1939)	17,18	2S	12E	SB	Class D. Gold claim in the Dale district, 10 miles west of Twentynine Palms, at an elevation of 2000 feet. A 2-foot quartz vein in granite, strikes N 20°W., dips 80°E., and is mineralized with galena, chalcopyrite, and free gold. Prospected by 3 shallow shafts about 8 feet deep in 1929. Later developed by a 35-foot vertical shaft, 60-foot tunnel, 40-foot tunnel, and 100 feet of drifts. Produced 1937-39 gold-silver ore containing about 5% lead and recoverable copper. (Eric 48:293; Tucker 29a:483-484)
	MacLeish	M. MacLeish, Blythe (1918)	appr.	5S	20E	SB	Class D. Type 1. Ore shipped in 1918 showed a smelter recovery of 54.6% lead, 85 ounces of silver per ton, 0.111 ounce of gold per ton, and recoverable copper. (Eric 48:293)
	McConkey	McConkey Mine, Twentynine Palms (1941)	appr.	2S	12E	SB	Class D. Type 2. Ore shipped from Dale district in 1941 contained 6.25% lead, 1.15% copper, 2.25 ounces of silver per ton, and 0.25 ounce of gold per ton. (Eric 48:293)
	Mecca	Mecca Mines, Inc., 727 West 7th Street, Los Angeles (1927)	appr.	4S	11E	SB	Class C. Type 2. Pinion district, 47 miles from Mecca. Inclined shaft 250 feet deep; about 1000 feet of drifts. Between 1923 and 1928 about 1050 tons of complex sulfide ore was mined and shipped. Smelter recovery averaged

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mecca (continued)						25% lead, 2.86% copper, 14.76 ounces of silver, and 0.452 ounce of gold per ton. (Eric 48:293)
172	Neal Group		25	3S	21E	SB	Class D, Type 2. Two claims in the Maria Mts., about 19 miles north of Blythe. A 50-foot felsite dike in limestone is mineralized with lead, silver, and copper. Developed by a 60-foot shaft and 100 feet of adits. (Tucker 29:491; 45:148)
	New Eldorado	Fred Vaile Los Angeles (1929) Lease to: John White, San Bernardino (1929) Horace W. Campbell Box 151, Twentynine Palms (1938)	17	3S	10E	SB	Class D. Three gold claims, 19 miles south of Twentynine Palms, in the Pinion district. A 5-to 6 foot quartz vein, striking north in granite-gneiss is mineralized with gold associated with galena. Oxidized ore contains wulfenite. In 1916 underground workings consisted of a 400-foot shaft with 2900 feet of lateral workings. The shaft was extended to 500 feet in 1930, with an additional 700 feet of drifts. Recorded production 1912-1916, 1930-1938 intermittently of about 6000 tons of gold-silver ore also containing 33,600 pounds of lead. (Tucker 29:485-486)
	Oro Mega	F. E. Grover 1223 West Bay Ave. Newport Beach, Cal. Operators: Arthur Becker, Leslie	appr.	3S	12E	SB	Class D, Type 1. Located 20 miles southeast of Twentynine Palms at the base of the east slope Pinto Mts., at the edge of the Joshua Tree National Monument. Development consists of 2 open cuts 60 feet by 600 feet by 3 feet, and by 2 adits. Concentrates representing about 7% of the bulk ore were shipped to Selby in 1949-1950. Recoverable metal in the bulk ore has

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Oro Mega (continued)	Spell, and Lyman Webster, P.O. Box 347, Twentynine Palms					averaged about 2.88% lead, 0.92 ounce of silver, 0.08 ounce of gold, and recoverable copper. Ore was milled at the Ivanhoe mill.
	Palisade	A. Villman Blythe (1919)	appr.	5S	20E	SB	Class D, Type 2. Shipped ore in 1919; smelter recovery was 13.48% lead, 6.10% copper, 6.73 ounces of silver, and some gold. (Eric 48:294)
	Palasades Group	G. Peterson Elsinore (1929)	4	6S	4W	SB	Class D. Group of 3 claims, 2 miles north of Elsinore. Narrow stringers in schist near granite contact, strike N 60° E. and dip 60° SE., contain gold-silver associated with galena and chalcopyrite. No known production. (Eric 48:294; Tucker 29a:491; 45:148)
	Red Cloud	S. & W. Mine Development Company Los Angeles (1935) Operator: E. A. Murphy Indio (1940)	5	7S	15E	SB	Class D. Comprises 3 patented gold claims in the Chuckwalla Mts., 9 miles south of Desert Center. A 6- to 14-foot quartz vein on contact between gneissoid and porphyritic granite contains free gold in association with galena and chalcopyrite. Underground workings consist of a 300-foot shaft with a 250-foot connecting tunnel and several hundred feet of drifts. Recorded production 1899-1901, 1932-1940, intermittent, of about 4200 tons of gold ore containing recoverable lead and copper. Scheelite reported also. (Eric 48:294; Merrill 19:539; Orcutt 90:900-901; Tucker 29:486-487; 45:141-142, 157)
	Rosalia						See: Santa Rosa

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
173	Santa Rosa (Rosalia)	W. H. Bellows, Perris (1901) Hook Bros., Perris (1915)	NW¼ of 31	4S	4W	SB	Class D, Type 1 (?). Pinacate district. A 3-foot quartz vein in decomposed rock; worked by open cuts and 2 shafts, 125 and 420 feet deep (1896). Vein strikes N 10°W. and dips 45°SW. Elevation at the mine is 2200 feet. Formerly located in San Diego County and described by Goodyear and Storms in San Diego County reports. Recorded production 1895-1901 of about 6700 ounces of gold. Last active in 1915 when lead ore was shipped to smelter; average recovery was 37% lead, 22.6 ounces of silver, and some copper. (Crawford 94:224-225; 96:314; Eric 48:295; Goodyear 88:526; Merrill 19:529; Sampson 35:514; Storms 92:384; Tucker 29:487)
	Scott Lode No. 1	McMillan & Plummer Blythe (1934)	appr.	5S	20E	SB	Class D, Type 2. Mine located 14 miles south of Rice. Developed by a 350-foot incline, 300-foot tunnel, and 120 feet of drifts. Shipped complex ore in 1924; smelter recovery was 24.82% lead, 5.72% copper, 16 ounces of silver, and 0.52 ounce of gold per ton. In 1934, treated 2099 tons of gold ore; base-metal recovery not reported. (Eric 48:295)
	Steel						See: Victor
	Victor (El Plomo, Steel)	Calvert & Fultz	32	4S	4W	SB	Class D. Eight gold claims in the Pincate district. A 3-foot quartz vein striking N, dipping 35°W in meta-

RIVERSIDE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Victor (El Plomo, Steel) (continued)						morphic rocks intruded by quartz diorite, is mineralized with free gold and argentiferous galena. Developed by a 200-foot, 30- degree inclined shaft, intersected on the 100-foot level by a 1200-foot tunnel. Production not known. (Crawford 94:225; 96:314; Goodyear 88:527; Sampson 35:514-515; Storms 93:384; Tucker 29:489; 45:144)
	Winfield No. 2	W. E. Covey, S. B. Mosher, Box 1135, Indio (1952) Operators: Scott & Lindsay, Box 154, Indio (1952)	appr.	4S	10E	SB	Class D. Type 2. Eagle Mt. district, 55 miles northeast of Indio. Small shipment of complex ore to Selby in 1952; smelter recovery approximately 2.62% lead, 5.20% copper, 6.50 ounces of silver, 0.05 ounce of gold, and some zinc.

SAN BERNARDINO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Alpha	California Sulfur Co., Los Angeles (1942)					Class D, Type 2. Located in the New York Mts. Shipped ore during 1942; average smelter recovery was 6.4% lead, 1.52% copper, 6 ounces of silver per ton, and some gold.
	Alta		24 19	17N 17N	8E 9E	SB SB	Class D. Silver mine. Has been confused with Riggs mine in earlier publications. Located in the West Silurian Hills north of Baker. Produced high-grade silver ore in 1910-1912, and in 1920. (Wright 53:ap. 96)
	Alvord	C. M. Alvord (1926) Operators: Dellosso Gold Mining Co., F.G. Dellosso, Huntington Park (1943) Roy V. Waughtel, Box 411, Yermo (1952)	1,2, 12	11N	3E	SB	Class D. Comprises 6 patented gold claims, 6 miles NE of Manix at 2500 feet elevation. Limestone intruded by granite is cut by porphyry dikes at right angles to bedding and overlain by basalt and tuffs. Mineralization which is gold in association with galena and chalcopyrite, extends beneath the basalt capping. Developed about 400 feet underground by adit and drifts. Production was from siliceous veins and limonitic outcrops. Recorded production of about 480 tons of gold ore 1918, 1926, and 1950. Concentrates shipped contained recoverable copper and lead. (Crawford 94:229; 96:319, 330; Eric 48:297; Irelan 88:499; Newman 23:63; Storms 93:359-360; Tucker 30:222; 31:281; 40:53-54; 43:438-439, pl, 7; Wright 53:70, ap. 23)
176	Anaco (Red Raven, Red Rover)	F. A. Rogers Los Angeles	30,31	7N	5W	SB	Class D, Type 1. Zinc prospect with some lead. Comprises 12 claims in the Shadow Mts., 5 miles north of

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Anaco (Red Raven, Red Rover) (continued)	Lease to: J. T. Pierson					Adelanto at an elevation of 3000 feet. Mineralization occurs along felsite dikes which intrude limestone. Developed by a 100-foot and a 70-foot shaft. (Tucker 30:267-268; 31:340-341; 43:474, pl. 7; Wright 53:ap. 71)
	Annex						See: Silver Hill
	Apex & Gold Standard	L.L. Draper, Cima (1936) W.G. & W.O. Merkle 1734 Pacific Avenue Long Beach (1953)	35	7N	4W	SB	Class D. Gold mine located on the east flank of Silver Mt., 4 miles north of Oro Grande. Oxidized deposit developed by shaft, open cuts, and a 300- to 400- foot adit. Gold and silver in association with galena occur in a shear zone in andesite. Mineralized zone strikes N 25° W., dips 50° SW. A small shipment of ore was made in 1936; smelter recovery was 3.33% lead, 1.50 ounces silver, and 3 ounces of gold per ton. (Tucker 30:222; 31:281-282; Wright 53:ap. 23, 24)
	April Fool	Ben Trueman (1922)					Class D, Type 2. Shipment of complex ore in 1922 containing 5.82% copper, and recoverable lead and zinc in addition to high silver-gold content. (Eric 48:298)
	Arcturas						See: Ibex
	Argyle	R.E. Perkins, Baker (1938)	appr.	7N	4W	SB	Class D. Silver Mt. district. Produced silver ore in 1937-38 containing recoverable lead.
	Arlington						See: Santa Fe

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
174	Aga Prospect	Otto F. Fuetterer, Baker	23,24 25,26	14N	8E	SB	Class D, Type 2. A lead-silver-copper-gold prospect 1 mile northwest of Baker. Several quartz veins in granite; developed by adits and trenches. (Wright 53:ap.71)
	A. J. Legg	A.J. Legg, Ibis (1907)					Class D, Type 1. Small shipment of ore in 1907; smelter recovery 25.5% lead and 18 ounces of silver per ton.
	Akron-Silver Reef						See: Silver Reef.
	Albermarle	W.R. Noack, Nipton (1948)	appr.	15N	14E	SB	Class D, Type 1. Ivanpah district. Developed by a 140-foot adit. Produced 1942-1948; average smelter recovery on ore shipped was 3.64% lead, 8.72 ounces of silver, 0.636 ounce of gold per ton and recoverable copper.
175	Alexander		9,10	19N	8E	SB	Class D, Type 1. Mine located at south end of Alexander Hills. Two quartz veins in Noonday dolomite. West vein strikes N 20E, dips 60° to 70°E and is 2 to 6 feet wide. Developed by a 200-foot drift with a stope 80-feet in maximum dimension. The east vein or group of veins is 6 to 20 feet wide, strikes N 10°W and is vertical. Developed by an adit over 100 feet long and a stope 100 feet in maximum dimension. Long idle. Production not known. (Wright 53:ap.71)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Arrowhead	E. G. Lane Taylorsville (1947)	appr.	9N	14E	SB	Class D. Providence district. Produced gold-silver ore in 1947 containing recoverable lead and copper.
	Atolia	Atolia Mining Company 1022 Crocker Building San Francisco Operators: Hoefling Bros. Surcease Mining Co. Box 786, Sacramento (1953)	19,20	30S	41E	MD	Class D. Tungsten mine. Veins occupying fault fissures in quartz monzonite which is cut by diorite, aplite granite, and diabase dikes, are mineralized with scheelite, pyrite, sphalerite, chalcopyrite, cinnabar, and other sulfides of hydrothermal origin. The sulfides are a minor constituent in the ore but copper and zinc are produced as a by-porduct from concentrates. A shipment of zinc concentrates in 1947 showed a smelter recovery of 78.6% zinc, 2.10 ounces of silver, and about 0.5% combined copper and lead. (Boalich 18:12; Cloudman 19:830-837; Hess 17:40, 44-45; Hewett 36:90; Hulin 25:70-78; 125-145; Kerr 46:61-62, 69, 148-151; Lemmon 40; Partridge 41:252-257, 264-266, 276, 278, 283, 284-285; Tucker 21:370-372; 24:96-97; 30:291-293; 31:365-366; 40:12, 55; 43:499, 506, pl. 7; Wright 53: 140-146, ap.111)
177	Avawatz Crown	W. W. Williams Whittier (1927) Avawatz Consolidated Mines Co., Alvin S. Carpenter, pres., Los Angeles (1943)	26	16N	6E	SB	Class D, Type 2. Comprises 6 patented claims in the Silver Lake district at 3500 feet elevation. Argentiferous galena, sphalerite, and chalcopyrite occur in brecciated quartzite. Developed by a 325-foot shaft with a 210-foot crosscut on the 300-level. Shipped complex ore in 1908; smelter recovery was 24.2% lead, 1.37% copper, 83.70 ounces of silver per ton and some gold. A small shipment of silver-lead ore was made in 1927. (Eric 48:298; Tucker 21:359-360; 30:268; 31:341; 43: 474, pl. 7; Wright 53:ap. 71)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Aviation	B. E. Del Mar, 4524 Alpha Street Los Angeles (1935)	8	3N	2E	SB	Class D. Gold-silver mine in San Bernardino Mts. Developed by a 100-foot adit, 25-foot winze, and open cuts. Produced gold ore in 1935 and 1937 also containing 3.88% lead, 4.33 ounces of silver, and recoverable copper. (Eric 48:298; Wright 53:ap. 71)
	B & B Group						See: Pilot.
178	Bagdad-Chase (Pacific, Barstow Mill, Butte Hill Group)	J. H. Hobbs, Glendora (1943) Lease to: Frank Royer, Red Mt., and Don F. Love, Ludlow (1952) Operator: Pacific Coast Mill & Mining Company 1020 Highland Ave. National City (1951)	7,8	6N	8E	SB	Class D, Type 2. Comprises 17 patented claims, 7 miles south of Ludlow in the Stedman district. Chalcopyrite, galena, gold, and silver in breccia on monzonite-rhyolite contact. Developed by shaft. Large recorded production of gold, silver and copper 1901 to 1952. Minor lead also recovered. (Cloudman 19:790; Eric 48:298; Gardner 40:261-275; Tucker 21:341-342; 30:218-219; 31:278-279; 38:15; 40:56-57, 232-233; 43:126-127, 440-441, pl. 7; Wright 53:71-72, ap. 24,25)
	Bank Roll						See: Green Gold.
	Barnett	J. E. Barnett Mining Co., Barnville (1911) H.H. Hodge Barnville (1915)	appr.	14N	16E	SB	Class D. Gold mine in the New York Mts. Shipped gold ore also containing 4.64% lead, 0.72% copper, and 2.86 ounces of silver per ton. See also Lost Morman. (Eric 48:299; Wright 53:ap. 72)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Barnett (continued)	Lost Morman Mining Company, Long Beach (1938)					
	Barrett (Hammerback and Patterson)	California American Mining Company Dr. Orman Lutz, pres. (1930)	18	12N	15E	SB	Class D. Gold mine on the east slope of Providence Mts. Quartz vein along fissure in granite; ore minerals are auriferous pyrite, chalcopyrite, and galena. Developed by two, 100-foot shafts and a 320-foot shaft. Production unknown. (Eric 48:298; Tucker 30:226; 31:287; Wright 53:ap. 25)
	Barstow Red	Barstow Red Company Barstow (1915)	appr.	10N	2W	SB	Class D. Silver-gold mine. Produced 1914-1915; some by-product lead recovered.
	Belle Gilroy (Belle McGilroy)						See: Lead Capping.
	Belmont	Belmont Mining Co., Dr. W. W. Ramsey Stockton (1943)	29	14N	1E	SB	Class D. Gold mine in the Goldstone district. Two parallel quartz veins in slate and schist. Developed by a 420-foot, 35-degree inclined shaft with 1000 feet of drifts on 4 levels. Belmont operated in conjection with Goldstone mine in 1917 and 1941 under the name of Goldstone-Belmont. (Tucker 24:46-47; 30:227; 31:287-288; 40:57; 43b:441, pl. 7; Wright 53:ap. 25)
	Beverly Glen	Thomas E. Creed, Cima (1948)	11,12 13,14	12N	15E	SB	Class D. Gold mine located 15 miles from Cima. Sulfide deposit developed by a 40-foot shaft and 55 feet of drifts. Average smelter recovery on ore shipped between 1941 and 1948 was 2.34% lead, 0.442% copper, 1.65 ounces of silver, and 0.548 ounce of gold per ton.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Big Cherokee	J.W.R. Hillard Beatty, Nevada (1939)	appr.	19N	10E	SB	Class D, Type 2. Kingston district. Shipped complex ore in 1939; smelter recovery was 4.6% lead, 1.77% copper, and 18.64 ounces of silver per ton. (Eric 48:299)
	Big Four (Red Bridge, Victor)	W.B. Redfield Estate Box 806, Barstow Lease to: W. A. Fritz, Long Beach (1943)	22 18,19	30S 14N	47E 1E	MD SB	Class D. Silver-gold mine in Goldstone district, 34 miles north of Barstow at 3500 feet elevation. Comprises 10 claims. Shale and schist cut by quartz stringers over a zone 1200 feet by about 5000 feet. Earliest recorded production was in 1916 when ore shipped contained 15.82 ounces of silver, 0.4% copper, and 1.71% lead. Ore shipped in 1938-39 was primarily gold-silver ore; base-metal not reported. Developed by 3 shafts about 1400 feet apart. (Cloudman 19:807; Eric 48:299; Tucker 30:249-250; 31:310; 40:57; 43:441, pl. 7; Wright 53:ap. 61)
179	Big Horn (Mable-Contention)	Walter Thompson and Edward Johnson, Baker (1941) Operator: Big Horn Exploration Co., Watsonville, c/o F. H. Wagenheim, Essex	20	9N	14E	SB	Class D, Type 1. Total of 18 claims on east slope of Providence Mts., 23 miles west of Essex at an elevation of 3750 feet. Quartz veins 1 to 4 feet wide in andesite dike in quartz monzonite are mineralized with galena, chalcopyrite, gold, and silver. Developed by an 80-foot adit. Produced 1933, 1938, 1940-41 a shipment of lead ore and a shipment of gold ore. Lead ore contained 15.7% lead and some copper and silver. (Eric 48:299; Tucker 40:58; 43b:441)
180	Big Horn Prospect	Jerry Korfist, Baker	35	13N	10E	SB	Class D, Type 1. North of Old Dad Mt. Siliceous zone in highly fractured dolomite 300 feet long and 2 to 5 feet wide is mineralized with galena and associated gold-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Big Horn Prospect (continued)						silver. Zone strikes east and dips steeply north. (Wright 53:ap. 72)
	Bismark						See: Calico Odessa.
	Baltic						See: Calico Odessa.
	Barstow Mill						See: Bagdad-Chase.
	Black Hawk						See: Santa Fe.
	Black Water						See: Silver Lode.
181	Blue Bell	F.C. Baker, Barstow (1951) Operators: R. V. Waughtel, Baker (1949) Ted Heins, 1251 Nancy Street, Barstow, and W. R. Long, 12707 Matteson Ave., Venice (1951)	27(?)	14N	7E	SB	Class D, Type 2. Located near Little Mike mine in the Soda Lake Mts., 14 miles NW of Baker. Lenses and veins in limestone near granite contact. Ore bodies range from 10 feet to 100 feet in maximum dimension. Chrysocolla, malachite, cerussite, galena, and chalcopyrite in a carbonate gangue. Developed by a 48-foot shaft and several irregular adits. Shipped complex ore to Selby in 1949 and 1951; average smelter recovery was 7.5% lead, 0.95% copper, 5.31 ounces of silver per ton, and some gold. Assays indicate copper present up to 4.50%. See also Hard Luck Group. (Wright 53:101, ap.72)
	Blue Eagle	Blue Eagle Mining Co., Nicholas Aldo, pres. Masters Builders Supply Co., 520 East Lockford Street, Lodi	19,20	6N	17E	SB	Class D. Gold mine north slope Old Woman Mts. Three parallel veins in granite about 200 feet apart, dip steeply east. Free gold associated with arsenopyrite, pyrite, galena, and sphalerite. Development on west vein consists of a 160-foot shaft and a 50-foot shaft about 1000 feet further north on the vein. East vein is de-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Blue Eagle (continued)						veloped by open cut. Reported active 1935-1939. (Tucker 40:58-59; 43:443, pl. 7: Wright 53: ap. 26,27)
182	Blue Buzzard	J. F. Boggs Estate, 21 Boggs Building 319 Fremont Street Las Vegas, Nevada Operators: Whitney & Bauer, Nipton (1940) John W. Ballance, & B. L. Whitney, Nipton (1948)	25 or 36	16N	13E	SB	Class D, Type 1. Ivanpah Mts. Mine developed in 1925 by a 90-foot inclined shaft and 60 feet of drifts. Recorded production 1925, 1940, 1947-48. Smelter recovery on ore shipped was 22.7% lead, 2.12 ounces of silver, and 0.38% copper. The mine is located about 3 miles south of Mt. Pass. A 2- to 5-foot shear zone in limestone several hundred feet from granite contact is highly chloritized and heavily stained with iron oxides. The zone is traceable for 150 feet in a NW direction; dip is SW and parallels the bedding. (Eric 48:299; Wright 53:101-103, ap. 72)
183	Blue Moon	T. J. Hammond Ivanpah (1940)	31	16N	14E	SB	Class D, Type 2. Clark Mt. district. Produced 1935-36, and in 1940; average smelter recovery has been 0.88% lead, 1.04% copper, 5.98 ounces of silver per ton, and 0.161 ounce of gold per ton.
	Blew Jordam						See: Cucamonga.
184	Bonanza King	Bonanza King Mines Fenner, Calif. (1936)	31	10N	14E	SB	Class D, Type 1. Comprises 9 claims patented, about 25 miles NW of Fenner on the east slope Providence Mts. at 4200 feet elevation. Irregular lenticular ore bodies about 4 to 20 feet in width in fissures parallel to contact of intrusive monzonite. Ore minerals are galena, cerussite, and silver chloride. Developed by a 540-foot vertical shaft with 5 levels at 100-foot intervals; also a winze to the 800-level, and adits. Total underground workings about 20,000 feet. Recorded production 1901 to

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bonanza King (continued)						1936, intermittent. (Cloudman 19:827; Crawford 94:376; 96:330,606; DeGroot 90:532; Eric 48:300; Irelan 88:500; Tucker 21:360-361; 24:198; 30:270; 31:342; 43:475, pl. 7; Wright 53: ap. 72,73)
	Brilliant						See: Ord Mountain. (Wright 53:66-67, ap. 17)
	Bronze	H. C. Ferres Ivanpah (1935)	29	14N	16E	SB	Class D. Gold-tungsten mine developed by a 100-foot shaft, 1200-foot tunnel and over 500 feet of drifts. Produced gold ore in 1934-35 containing recoverable copper, lead, and silver. Also a tungsten producer. (Eric 48:300; Jenkins 42:350; Wright 53:ap. 27)
	Budget	F. E. McCaughey Nipton (1939)	appr.	16N	13E	SB	Class D, Type 1. Lead-silver mine; also gold. Shipped gold-silver ore in 1939 containing 1.56% lead and recoverable copper. (Eric 48:300)
185	Bullion	P. Hale Nipton (1953) Operators: J. Johnson, Cima (1943) A. H. Garner, Ivanpah (1917)	10,15	15N	14E	SB	Class D, Type 2. Comprises 12 claims in Bullion district on east slope Ivanpah Mts., 10 miles north of Cima. Argentiferous cerussite in limestone in the oxidized zone. Primary ore contains galena and chalcopyrite. Developed by a 200-foot, 45 degree inclined shaft in 1917. Produced 1916-1917; average smelter recovery was 15% lead, 7.87% copper, 0.51 ounce of silver, and 0.157 ounce of gold per ton. Reported to have produced around 1860; ore shipped to Wales.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bullion (continued)						(Eric 48:300; Irelan 88:499; Tucker 30:270-271; 31: 343; 43b:475, pl. 7; Wright 53:ap. 73)
186	Bumper Group	E. H. Hall H. A. Norton Needles (1930)	30	7N	23E	SB	Class D, Type 2. North end of Chemehuevis Mts., 12 miles south of Needles, at 1200 feet elevation. Comprises 6 claims. Oxidized deposit developed by a 22-foot shaft and 65-foot adit. Reported ore minerals are malachite and azurite with franklinite (?) and zincite. No recorded production; long idle.
							(Cloudman 19:785; Eric 48:300; Tucker 30:206-207; 31: 266; Wright 53: ap. 5)
187	Burcham (Total Wreck)	R. L. Burcham Estate c/o John S. Chapman 530 West 6th Street Los Angeles Operators: J. L. Osborne, Daggett (1945)	15,16 21	10N	1E	SB	Class C, Type 1. Comprises 21 unpatented claims in Calico Mts., 12 miles NE of Barstow at 1800 to 2850 feet elevation. Irregular masses of galena, sphalerite, chalcopyrite, cerussite, cerargyrite, and gold in faulted Tertiary tuffs, flows, and breccia. Gangue minerals are quartz, barite, iron, and manganese oxides. Produced 1927 to 1945 intermittently. Average smelter recovery was 11% lead, 2.05 ounces of silver, 0.404 ounce of gold per ton, and recoverable zinc and copper.
		Burcham Mines Inc., Los Angeles (1943)					(Eric 48:300; Erwin 40:302-303; Tucker 21:351; 30:285-286; 31:358-359; 40:59-61, 242; 43b:475-476, pl. 7; Wright 53: ap.73)
	C & K						See: Lead Capping.
							(Wright 53: ap. 73)
188	Cactus Flat (Morongo)	Mrs. Laura B. Walbeck Big Bear Lake (1943)	19	3N	2E	SB	Class D, Type 1. Comprises 4 claims on northeast slope San Bernardino Mts., 14 miles southeast of Lucerne Valley at 6000 feet elevation. Granite intruding limestone.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Cactus Flat (continued) (Morongo)						Galena, lead carbonate, and copper minerals occur in 12 to 18 inch stringers, closely associated with 6- to 8-foot granite porphyry dikes. Iron oxides are prevalent in the gangue. Developed by 4 shafts and an adit. No recorded production. (Crawford 94:234; 96:607; Crossman 90: 228, 233; DeGroot 90:522; Irelan 88:503; Tucker 30:280, 31: 353; 43b:476-477, pl. 7; Wright 53: ap.73, 74)
	Calico-Odessa (Baltic, Bismark, Blackfoot, Garfield, Odessa, Thunderer)	Mrs. J. R. Lane Yermo (1943) Operator: Louis Warnken Keeler (1946)	10,11, 14,15 23	10N	1E	SB	Class D. Silver mine. A total of 21 patented and 23 unpatented claims 5 miles NW of Yermo at an elevation of 2600 to 2800 feet. Faults in rhyolite tuff are mineralized with cerargyrite, embolite, cerussite, and some oxidized copper minerals, in a barite, quartz, jasper, and maganese oxide gangue. Main production has been from oxidized ore which was cyanided for its silver content. Base metals were recovered in 1946 from old tailings shipped to smelter. About 49,000 pounds of lead was recovered. Developed by a vertical shaft and tunnels with a total of over 50,000 feet of underground workings. (Crawford 96:606; 607, 608; Eric 48:301; Erwin 40:301-302; Goodyear 88:510-511; Irelan 88:497, 510-511; Lindgren 87:723-726; Storms 93:343; Tucker 21:360,362, 363, pl. 6; 30:271; 31:343-345; 40:243-244; 43b: 477; Wright 53:130-131, ap. 98)
	California	J. M. Love Pasadena (1915)	appr.	15N	7W	SB	Class D. Randsburg silver district. Produced silver-lead ore in 1911; smelter recovery 2.73% lead and 40.50 ounces of silver per ton. In 1915 about 1135 tons of gold-silver ore was produced.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
189	California Comstock (Louisiana-California, Leiser Ray, Vanadium Gold)	T. W. Craig, Goffs (1953) Operators: E. S. Gable Box 267 San Bernardino (1935) California Comstock Gold Mines Ltd. 263 Arrowhead Avenue San Bernardino (1936-37)	15,22	11N	18E	SB	Class D, Type 2. Eight claims in Signal Hill district, 8 miles north of Goffs at 3350 feet elevation. Two parallel quartz veins 4 to 12 feet wide in granite, strike E and dip 45°N. Complex mineralization of vanadinite, cuprodescloizite, with lead, silver, and gold. Several unsuccessful attempts have been made to recover vanadium; last was by California Comstock Gold Mines Ltd., in 1936-37. Mine developed by 925-foot vertical shaft with 9 levels; also an inclined shaft and tunnels. Total underground development about 6000 feet. Sulfide ore was shipped in 1913, 1916, 1917, 1935-36; gold, silver, lead, and copper were recovered. (Boalich 18:13, 27; Cloudman 19:849, 850-852; Eric 48: 310; Newman 23:310-311; Tucker 21:374; 30:296; 31: 369; 40:70; Wright 53:ap. 130)
190	California-Hercules	Roy Kitching 686 Elmira Street Pasadena (1943)	29,32	2N	6W	SB	Class D, Type 1. Group of 32 claims on the south fork of Lytle Creek, on the northeast slope of San Gabriel Mts., 6 miles southwest of Keenbrook at an elevation of 4500 feet. Sphalerite, galena, and cerussite occur in fractures in felsite and on contact with limestone which it intrudes. Developed by open cuts, shallow shafts, and adits. No known production. (Tucker 43b:477-478, pl. 7; Wright 53:ap. 74)
	California Rand						See: Kelley.
	Canyon	Frank R. Rathburn Cima (1935)	appr.	17N	10E	SB	Class D, Type 1. Shadow Mt. district, 12 miles east of Valjean on Tonopah & Tidewater R. R. Mine developed by a 70-foot shaft, 25-foot incline, tunnels, and drifts. Small shipments of ore in 1926 and 1934; smelter recov-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Canyon (continued)						ery averaged about 14 ounces of silver, 0.7 ounce of gold, 27% lead, and 2% copper. Cinnabar also reported in ore.
191	Carbonate	California Portland Cement Co., Oro Grande (1953)	17	6N	4W	SB	Class C, Type 1. Ore reported as being mainly cerussite in an iron oxide and manganese oxide gangue, occuring along a shear zone in limestone and traceable for 1/2 mile. Developed by a 225-foot shaft and several shallow shafts. Recorded production 1891-1940 intermittent. Substantial amounts of copper and gold recovered in addition to silver-lead. (Cloudman 19:811-812; Crawford 94:26; 96:33, 320, 607; Crossman 90:230,233-234; Eric 48:301; Storms 93:361-363; Tucker 30:274; 31:347; Wright 53:ap.74)
192	Carbonate	J. Mulcahy 998 - 14th Street San Bernardino	23	10N	1E	SE	Class D, Type 1. Located at junction of Bismark and Odessa Canyons in the Calico district. Brecciated, faulted tuff impregnated with oxidized silver and lead minerals. Hand-picked ore reported 25 ounces silver, 0.187 ounce gold, and 19% lead. Developed by several hundred feet of surface cuts and short adits. Production unknown. (Wright 53:ap. 98)
	Carbonate Hill	Bainbridge and McHenry, Nipton (1948)	appr.	3N	1W	SB	Class D, Type 1. Holcomb district, 43 miles east of Victorville. Shipped ore in 1948; smelter recovery was 10.34% zinc, 9.84% lead and 1.586 ounces of silver per ton.
193	Carbonate King	Beatrice Brackney Arcadia (1951)	5 31	17N 18N	14E 14E	SB SB	Class C, Type 1. Located on NE slope of Clark Mt. A group of 6 claims. Lead-zinc-silver mineralization along a NE vertical fracture in dolmite heavily stained

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Carbonate King (continued)	Operator: O. B. DeWitt 481 Church Street San Bernardino, (1951)					with iron and manganese oxides. Staining and mineralization extend for 25 feet on either side of fractures. Principal ore body was 3 to 4 feet by 100 feet. Mined from a 160-foot adit and open cuts. A second adit, 150 feet lower was driven 500 feet and ended in barren dolomite. Owner reports mine abandoned in 1952. Recorded production 1917-1951. Ore shipped to Toole, Utah. Last shipments showed a smelter recovery of 12.52% zinc, 12.54% lead, and minor silver and gold. Earlier shipments contained a higher ratio of zinc to lead; about 4 to 1. (Tucker 30:274; 31:347; 43b:478, pl. 7; Wright 53: ap. 74)
194	Carbonate King Zinc (Crystal Cave)	Crystal Cave Mining Co. H. C. Moore, Pres. Isabel Drive Los Angeles Lease to: W. F. Huston, Mountain Pass (1941) P.R. Ressler, Nipton (1942) J. Q. Little, Nipton (1951)	4 32	15½N 16N	14E 14E	SB SB	Class B, Type 1. Comprises 14 claims on west slope of Kokoweef Peak, 5 miles southeast of Mountain Pass at 5000 feet elevation. Ore bodies 10 to 12 feet wide in fractured dolomitic limestone. Oxidized ore of hydrozincite, smithsonite, and cerussite, with some galena and sphalerite. Recorded production 1942-1951 smelter recovery was about 11 ounces of silver, 33.4% zinc, 0.98% lead, and minor gold. Last shipments made in 1951 were slightly higher grade ore. (Eric 48:301; Richards 43; Tucker 43b:127-128, 478-479, pl. 7; Wright 53:103-106, ap. 74)
	Carden	J. L. Carden, Bagdad (1921)	appr.	4N	10E	SB	Class D, Type 1. Shipped ore in 1921; smelter recovery was 28.28% lead, 25 ounces of silver per ton, and recoverable gold.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Carlyle	Mrs. Shaeffer, Pomona (1953) Operators: Carlyle Mining Corp., Twentynine Palms (1938) Paul E. Nett, Twentynine Palms (1941)	11,14	1S	12E	SB	Class D. Silver-gold mine in the Dale district of Pinto Mts. Comprises 4 patented and 4 unpatented claims 7 miles NE of New Dale, at 3000 feet elevation. Vein 6 to 12 feet wide along fissure in diorite and granodiorite contains galena, cerussite, pyrargyrite, polybasite, stephanite, and cerargyrite. Developed by a 1200-foot tunnel, 78-foot shaft and 500 feet of drifts from a 680-foot winze. Large recorded silver-gold production 1934 to 1941; also a substantial lead and copper recovery. (Cloudman 19:803; Eric 48:301; Tucker 38:15; 40: 61-62; 43:444-445, pl. 7; Wright 53:73-74, ap. 29, 75, 98)
	Cave Springs						See: Imperial Lode. (Wright 53: ap. 77)
	Cerro de la Plata (Oro Plata)	R. J. McCausland, 315 North Swall Drive, Beverly Hills (1935)	appr.	6N	17E	SB	Class D. Type 1. Lead-silver-gold mineralization in steeply dipping quartz veins in granite. Developed by 4 shafts, 30 feet to 170 feet deep, sunk along the vein for 1200 feet; also open cuts. Production not known. (Tucker 30:281; 31:354; Wright 53: ap. 75)
	Chamberlain	H. Chamberlain, Kelso (1913)					Class D. Shipped silver-gold ore in 1913 containing recoverable lead.
	Chambers						See: Silver Rule. (Eric 48:301)
	Colosseum	Colosseum Mining and Smelting Co., C. W. Gowman, president, 7371 West Sunset Blvd., Hollywood	10,14	17N	13E	SB	Class D. Comprises 2 patented gold claims and 32 held by location on NW slope of Clark Mts., 10 miles north of Valley Wells at 5500 to 6100 feet elevation. Auriferous sulfides, chalcopyrite, sphalerite, and galena, occur in fractures in a rhyolite plug in gneissoid granite. Developed by a 200-foot vertical shaft, 1600-foot tunnel, 1000 feet of drifts and crosscuts, and about 5000 feet of

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Colosseum (continued)	Lease to: Walter F. Lineberger, Harold Chase, 1012 State Street, Santa Barbara (1938-42)					diamond drill holes between 1938 and 1942. Produced gold-silver concentrates containing recoverable lead and copper 1929-39. (Eric 48:302; Tucker 24:92; 30:231-232; 31:291-292; 43b:128-129, 446, pl. 7; Wright 53: ap. 30)
	Columbia						See: Macedonia. (Eric 48:311)
	Concha	L. Concha, Victorville (1911)	appr.	5N	4W	SB	Class D. Small shipment of high-grade gold ore in 1911, containing 6.90% lead and 2.40% copper. (Eric 48:302)
	Copper Crystal	Richard D. Davis, 1144 - 11th Street, San Bernardino (1951)	appr.	19N	2W	SB	Class D. Type 1. Slate Range district (?). Small shipment to Tooele, Utah, in 1951; smelter recovery was 1.67% zinc, 3.58% lead, 2.75 ounces of silver per ton, and recoverable copper.
195	Copper Queen	Paramount Mining Company, 1106 Isabel Street, Burbank Operator: Colossus Copper Company, Barnwell (1944)	30	14N	16E	SB	Class D. Type 2. Copper-tungsten-zinc deposit in New York Mts. A vein with maximum width of 10 feet occurs along vertical contact between Goodsprings dolomite and intrusive quartz monzonite. Developed by 3 south-trending adits totaling about 1000 feet. No known production. (Eric 48:303; Wright 53: ap. 7)
196	Copper World (Ivanpah, Old Ivanpah Copper)	Ivanpah Copper Company, L. D. Godshall, Manager, Cima (1942) Operator: L. D. Foreman (1944)	6	16N	13E	SB	Class B. Type 2. Comprises 4 patented claims on SE slope of Clark Mt., 3 miles NE of Valley Wells, at 5200 feet elevation. Lead-copper-silver-gold mineralization in a 4- to 8-foot vein striking N 40° W., dipping 50° SW at limestone and quartz monzonite contact. Produced 1906-08, 1916-18, and in 1944 when old tailings were treated. Main production was from 1917 to 1920 when smelter recovery averaged about 6.75% copper, 10% lead, 5.80 ounces of silver per ton and some gold. (Aubury 02:254; 08:326-330; Cloudman 19:786; Crawford 94:69; 96:61; Eric 48:303; Tucker 21:339-340; 30:209; 31:269; 43:432-433, pl. 7; Wright 53:63, ap. 8)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Cresent	Kunze, Conway, and Roach, Nevada (1916)	appr.	16N	16E	SB	Class D. Type 1. Nipton area. Shipped ore in 1915-16; smelter recovery was 9.40% lead and 96.80 ounces of silver per ton.
	Cresent Mining Company	Cresent Mining Company, Daggett (1915)	appr.	9N	1E	SB	Class D. Type 1. Small shipment of ore in 1915; smelter recovery 23.90% lead, 10.15 ounces of silver per ton, and 0.904 ounce of gold per ton.
	Crystal Cave						See: Carbonate King Zinc.
197	Crystal Cones No. 4	L. D. Ressler, Nipon (1942)	4	15N	14E	SB	Class D. Type 2. Zinc-copper mine. See also Carbonate King zinc mine; probably part of. (Eric 48:303; Wright 53: ap. 75)
	Crystal Dome	A. J. Klamt, Trona (1917)	appr.	19N	3E	SB	Class C. Type 1. Slate Range district. Lead mine developed by 65-foot shaft, 100-foot adit, and drifts. Shipped sulfide and carbonate ore during 1916 and 1917. Tonnage not known. Silver content was very low; only 4 ounces per ton of lead recovered.
198	Cucamonga Zinc (Blew Jordam)	Rowland B. Lyttle, 2821 Sickel Street, Los Angeles (1952)	25	2N	7W	SB	Class D. Type 1. Comprises one patented and one unpatented claim at headwaters of Lyttle Creek on east slope of Cucamonga Peak. Contact deposit in 30-foot tactite zone of garnet-epidote rock. Zone traceable for 1000 feet along granite-limestone contact. Developed by open cuts and trenches. Sampling across a 5-foot zone indicates 3.6% lead, 3.2 to 13.1% zinc, and 0.3 to 6.65 ounces of silver. Cadium from the mineral greenockite also reported. (Tucker 43:480, pl. 7; Wright 53:106, ap. 75)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	D. R. Oliver	D. R. Oliver, Daggett (1909)	appr.	6N	4W	SB	Class D. Type 1. Oro Grande district. Shipped one ton of silver ore in 1909 and 100 tons of zinc ore in 1915. This may be from the Carbonate mine, which see.
	Davis & Maxfield	Davis & Maxfield, Hallock (1918)					Class D. Type 1. Shipped silver-lead ore in 1918; smelter recovery was 19.57% lead, 41 ounces of silver per ton, and recoverable copper. (Eric 48:303)
	Death Valley	J. Lee Strawn, Cima (1919) E. Eardley, Salt Lake City (1932) Rose Maria Mining Co., 7105 Broadway, Los Angeles (1951)	11	13N	14E	SB	Class D. Seven silver claims, 3 miles SE of Cima at an elevation of 4400 feet. Two parallel veins, 4 feet and 7 feet wide occur 250 feet apart in diorite and granite. Veins strike NE and dip SE, and are mineralized with argentiferous galena. The principal ore mineral in the oxidized zone is cerargyrite. Developed by 2 inclined shafts 1500 feet apart; one is a 400-foot, 45° inclined shaft with 4 levels, the other a 285-foot, 70° incline, with a 135-foot drift on the 150-level. Large recorded silver production 1907-1915, 1919, and 1932. About 31,000 pounds of by-product lead was recovered; also gold. (Tucker 30:275-277; 31:348-349; 43b:480, pl. 7; Wright 53:106-107, ap. 76)
	Del Oro	H. B. Snyder, Los Angeles (1940) Stanley Parker Mining Co., 817 Roosevelt Building, Los Angeles (1950)	appr.	6N	4W	SB	Class D. Gold mine in the Silver Mt. district. Oxidized deposit developed by a 200-foot shaft and 600 feet of drifts. Produced gold by direct recovery 1939-40. High-grade gold ore shipped to smelter contained recoverable silver, copper and lead. (Eric 48:303; Wright 53: ap. 32)
	Denver	Thomas Cunningham, Silver Lake (1911)	18	11N	17E	SB	Class D. Gold-silver-lead mine on east slope of Hockberry Mt., in Miocene volcanics. Developed by 100-foot

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Denver (continued)	J. C. Walker, Goffs (1930) J. L. Larrieu, Box 21 Fenner (1953)					inclined shaft with a 95-foot tunnel and 400 feet of drifts (1930). Main production has been gold which was recovered by direct methods. In 1911-12 some ore was shipped; smelter recovery was 14.65% lead, 2.06 ounces of silver, and 0.333 ounce of gold per ton. (Wright 53: ap. 32)
199	Desert Butte Group	Parks and Crowley Barstow (1930)	16	3N	16E	SB	Class D, Type 2. Copper-zinc-lead mine in north end of Iron Mts., east of Cadiz Lake. Developed by a 325-foot adit which cuts complex sulfide zone 45 feet below outcrop. Reported to have shipped 40 tons of complex ore to Selby in 1914. (Cloudman 19:786; Eric 48:304; Tucker 30:210; 31:269-271; Wright 53: ap. 8)
	Desert King	T. W. Van Slyck Needles (1915)	appr.	9N	22E	SB	Class D, Type 1. Needles district. Shipped ore in 1915; smelter recovery 4.56% lead, 126 ounces of silver per ton, and 0.214 ounce of gold per ton.
	Desert Queen						See: Imperial Lode (Wright 53: ap. 77)
	Doran	A. L. Doran Silver Lake (1911)	appr.	15N	9E	SB	Class D, Type 2. Shipped to smelter in 1911; recovery was 6.70% lead, 1.23% copper, 7.92 ounces of silver per ton, and 0.04 ounce of gold per ton. (Eric 48:304)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Double Eagle	J. F. Miller, Box 485 Lucerne Valley (1952)	appr.	15N	7W	SB	Class D, Type 1. Mine located in Lava Bed district. Small shipment to custom mill in 1952; recovery was 3.78% zinc, 7.57% lead, 9.61 ounces of silver, and recoverable copper.
	Dutch Silver Claim	C. C. Townsend, Cima (1928)	appr.	14N	15E	SB	Class D, Type 1. Located in the New York Mts., 6 miles east of Cima. Developed by a 200-foot vertical shaft, with 70 feet of drifts on the 70-level and 60 feet on the 150-level. Produced oxidized ore 1920-1928, smelter recovery averaged 12.90% lead, 63.80 ounces of silver per ton, and 0.58% copper. (Eric 48:304)
	D.V.	C. M. Alvord (1926)	appr.	15N	14E	SB	Class D, Type 1. Cima district. Shipped ore and concentrates in 1926; average recoverable metal in ore was 4.38% lead, 2 ounces of silver per ton, 0.715 ounce of gold per ton, and recoverable copper. (Eric 48:304)
	Eastern Star	L. W. Loomis	17	17N	10E	SB	Class D. Silver prospect(?). South of Kingston Wash. Several lead-silver veins in highly brecciated granite-gneiss and quartzite of pre-Cambrian age. Developed by 2 short adits. Reported to have produced some high-grade ore. (Wright 53: ap. 76)
	Emerson	S. L. Emerson, Hodge (1937)	15,22	4N	5E	SB	Class D. Comprises 10 gold-silver claims in the Dry Lake district, 50 miles east of Victorville. Seven parallel quartz veins 2 to 4 feet wide in granite

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Emerson (continued)						strike NW, dip 70°SW and are mineralized with silver-lead-gold. Developed by a 70 degree inclined shaft 412 feet deep, about 2000 feet of drifts, and a tunnel. Produced intermittently between 1918 and 1937, about 935 tons of gold-silver ore containing recoverable lead. In 1918 silver-lead ore was shipped; smelter recovery was 30.90 ounces of silver per ton, 16.20% lead, and 0.81% copper. (Eric 48:304; Newman 23:63; Tucker 30: 234; 31:294; Wright 53: ap. 34)
200	Emperor (Vulture)	Ivanpah Copper Company, Nipton (1919)	31	17N	13E	SB	Class C. Type 2. Complex ore at limestone-granite contact. Developed by an adit with raises, winzes, and crosscuts. Shipped oxidized ore, 1915-1919; average smelter recovery was 0.71% zinc, 1.45% lead, 3.68% copper, 2.04 ounces silver per ton, and minor gold. (Cloudman 19:816; Eric 48:304; Tucker 21:340-341; 30:210; 31:271; 43:pl.7; Wright 53: ap. 21)
	Erisman	J. F. Erisman, Bakersfield (1928)					Class D. Type 1. Shipped silver-lead ore in 1928; average smelter recovery was 7.95% lead, 27.94 ounces of silver per ton, 0.52% copper, and some gold. (Eric 48:305)
	Everett & Evelyn	G. Meyers, Cajon, (1930)					Class D. Type 1. Buckeye district, 8 miles from Broadwell along the Tonopah & Tidewater R. R. Developed by a 100-foot vertical shaft and 350-foot connecting tunnel. Shipped to smelter in 1930; average recovery was 28% lead, and 2.19 ounces of silver per ton.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Fenner Smelting Company						See: Lead Capping. (Wright 53: ap. 76).
	Florence						See: Blue Eagle. (Wright 53: ap. 26)
	Forty Mile Group	R. L. Kincaid, Searchlight, Nevada, Alexander & Robinson, Goodsprings, Nevada (1938)	appr.	19N	10E	SB	Class D, Type 1. Kingston Mts., 30 miles west of Jean, Nevada. Mine developed by a 30-foot adit. Shipped ore in 1938; smelter recovery was 17.25% zinc, 3.07 ounces of silver per ton, and 0.089 ounce of gold per ton.
	Forty Nine	J. A. Frederickson, et al. Cima (1939)	appr.	19N	10E	SB	Class D, Type 1. Kingston district. Shipped ore in 1939; smelter recovery 15.70% lead, 2.60 ounces of silver per ton, and 0.091 ounce of gold per ton. May be same as Forty Mile group.
201	Francis Copper	Francis Copper Mining Co., C. Colcock Jones, president, 102 South Occidental Blvd. Los Angeles (1943)	9	11N	14E	SB	Class D, Type 2. Located at NE end of the Providence Mts. Veins 6 to 30 feet wide in quartz porphyry intrusion in schist, mineralized with chalcopyrite, galena, sphalerite, and scheelite. Developed by a 70-foot and 140-foot shaft with 600 feet of drifts. Reported production of 307 tons of 2% copper ore with 10 ounces of silver per ton. R.F.C. loan in 1943. (Eric 48:305; Jenkins 42:351; Kerr 46:164; Tucker 21: 341; 30:210-213; 31:271-272; 43b:434, pl. 7; Wright 53: ap. 9)
	Frank Royer						See: Kelley.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Fremont						See: Mohawk. (Eric 48:305)
	Fremont Peak	Frank Bullock, Baker (1946) Monarch Rand Mining Company, Randsburg (1925)	appr.	14N	7W	SB	Class D. Randsburg district. Gold mine. Developed by a 185-foot vertical shaft and 200 feet of drifts. Produced 1925 and 1946 a small tonnage of highgrade gold ore containing recoverable silver, lead and copper.
202	G. A. Fayle	G. A. Fayle, Cima (1919)	12(?)	16N	13E	SB	Class C. Type 2. Located in Mescal Range. Produced copper-gold-silver ore in 1917; average smelter recovery was 17% copper, 9.02 ounces of silver per ton, and 0.053 ounce of gold per ton. Complex ore shipped in 1918 and 1919 showed an average smelter recovery of 15.20% lead, 3.06% copper, 8.52 ounces of silver per ton, and 0.03 ounce of gold per ton. (Eric 48:305; Wright 53: ap. 9)
	Galena King	Ted Chastin, Boulder City, Nevada (1939)	appr.	17N	13E	SB	Class D. Type 1. Clark Mt. district. Mine developed by 15-foot open cut and 2 short drifts totalling 21 feet. Small shipment of ore in 1939; smelter recovery was 75% lead and about 1 ounce of silver per ton.
203	Garfield	Garfield Lead and Silver Mines, Joseph Baumgartner, President, Bakersfield	12(?)	3N	1E	SB	Class D. Type 1. Comprises 9 claims on the east slope of San Bernardino Mts., 12 miles SE of Lucerne, at 5000 feet elevation. Irregular bodies of galena with cerussite and wulfenite occur in brecciated limestone along fractures which strike NW and dip 50° NE. Developed by 2 crosscut adits with a 400-foot vertical interval. Reported shipping ore in 1932. (Tucker 43b:480, pl. 7; Wright 53: ap. 76)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Garfield	L. B. Lane, Yermo (1939)	appr.	10N	1E	SB	Class D. Shipped silver ore in 1939 containing recoverable copper and lead. See also Calico-Odessa; later included with.
	Gemco	Grey Eagle Mining Company, Essex (1936) Walter Zindell, John Tunney, Essex (1953)	10	5N	17E	SB	Class D. Gold-silver mine 19 miles south of Danby in Old Woman Mts. Ore contains galena, sphalerite, argentite, chalcopyrite, and gold, in veins in granite. Developed by a 60-foot vertical shaft and 200 feet of drifts. Recorded production in 1936 of 32 tons of gold-silver ore containing recoverable lead. (Wright 53: ap. 76)
	Gillman	R. H. Gillman, Victorville (1912)					Class D. Type 1. Shipped silver-lead ore in 1912; smelter recovery was 24.30% lead and 14.20 ounces of silver per ton.
	Gladstone						See: Mowry. (Crawford 96:321; Storms 93:358-359)
	Globe	Glenn Hollis, Kelso	9	11N	14E	SB	Class D. Gold mine on the west slope of Providence Mts. Quartz vein in granite-gneiss strikes west, dips 65°S and is mineralized with pyrite, galena, gold and silver. Developed by a 1000-foot adit. Worked as early as 1913. Now idle.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Globe (continued)						(Tucker 30:236; 31:296; Wright 53: ap. 35)
	Gold Bronze	W. L. Marsh, Ivanpah (1940) C. A. Bell, Ivanpah (1930)	2	14N	16E	SB	Class D. Gold mine 4½ miles south of Ivanpah. A total of 7 claims located in the Vanderbilt district at an elevation of 5200 feet. Two parallel 6-foot quartz veins striking east in granite-gneiss are mineralized with gold and silver in association with galena, chalcopyrite and pyrite. Developed by a 300-foot inclined shaft, a 200-foot inclined shaft with an 80-foot connecting tunnel; also 1200 feet of drifts. Intermittent production 1902-1940 of about 260 tons of gold ore from the oxidized zone. Minor lead and copper were also recovered. (Crawford 94:232; 96:321; Eric 48:306; Storms 93:367; Tucker 30:236; 31:297; Wright 53: ap.36)
	Gold Hill	Earl S. Bunting, Nipton (1942) G. C. Kemple Box 55, Goodsprings, Nevada (1951) Jim Stocker, Big Bear (1953)	17	2N	2E	SB	Class D. Comprises 12 gold-silver claims about 8 miles east of Pine Knot, Big Bear Lake, at an elevation of 6700 to 7280 feet. A series of parallel veins 2 to 10 feet wide in quartzite are mineralized near the contact with diabase and monzonite, by galena and associated gold-silver. Developed by a 54-foot shaft and 100 feet of trenching. Ore shipped in 1942 contained 8.78% lead, 12.82 ounces of silver per ton, and recoverable copper and gold. A shipment in 1951 in addition to gold-silver contained 3.07% lead and recoverable copper. (Eric 48:306; Tucker 40:66; 43b:452, pl. 7; Wright 53: ap. 37)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
204	Gold Hill	Shadow Mt. Mines Paul G. McKenry, Pres. Nipton (1953)	10	17N	11E	SB	Class D, Type 1. Located 9 miles NW of Valley Wells. Comprises 20 claims formerly included in Foster Mines Co. holdings. A series of brecciated and recemented quartz veins along a series of north trending faults in garnet-quartz-biotite schist and diorite-gneiss are mineralized with galena, cerussite, and oxidized silver minerals. Developed by a 90-foot, 70-degree inclined shaft, a 30-foot and a 60-foot shaft, and open cuts. Reported milling 100 tons in 1950. (Tucker 43b:480-481; Wright 53:107-108, ap. 77)
	Gold Peak	R. H. Gilman Pasadena (1913) R. E. Johnson, Victorville (1940)	30 or 31	6N	3E	SB	Class D. Gold mine in Fry Mts., northeast of Victorville. Four parallel veins in quartz-monzonite, strike north, vertical dip, width 2 to 4 feet. Gold associated with pyrite and galena. Developed by a 120-foot vertical shaft with levels at 50 and 100 feet. Large gold production 1903-1904; ore milled at Old Woman Springs. Base ore shipped in 1913; smelter recovery 44.7% lead, 50 ounces of silver per ton, and 0.334 ounce of gold per ton; also recoverable copper. (Cloudman 19:810; Eric 48:306; Gardner 40:pl. 2; Tucker 40:236; Wright 53:ap. 38)
	Gold Point						See: Murray. (Wright 53: ap. 38)
	Gold Rose						See: Gold Rose, Riverside County. (Wright 53: ap. 39). Formerly described in San Bernardino County reports. (Tucker 30:238; 31:298-299; 40:67; 43b: 453, pl. 7)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Golden Eagle	Arthur Henry, Cima (1919) Bower & Moore, Amboy (1941)	appr.	6N	12E	SB	Class D. Gold-silver mine in Old Woman Mts., 4 miles south of Siam. Developed by a small open cut (1941) and an 80-foot shaft, 50-foot shaft, 450-foot tunnel, and 90-foot winze in 1919. Shipment of gold ore in 1919 also contained 2.10% lead, 2.80 ounces of silver, and recoverable copper. Some gold produced in 1941. (Eric 48:306)
	Golden Witch	Charles Hile Operators: Golden Witch Mining Company, Box 493 Colton (1952)	appr.	10N	1W	SB	Class D, Type 1. Barstow district. Milled lead-silver ore during 1952. Concentrates representing about 17.5% of bulk ore showed a smelter recovery of 26% lead, 8.78 ounces of silver, 0.52% copper, and 0.20 ounce of gold per ton.
	Golden Wonder	Henry Greene Victorville (1928)		16N	14E	SB	Class D. Gold mine developed by 200 feet of drifts. Shipped some ore in 1928; smelter recovery about 8.70% lead, 2 ounces of silver per ton, and recoverable copper, in addition to gold. (Eric 48:306)
	Goldstone	R. D. and Lee Redfield, Box 806 Barstow (1953)	19	14N	1E	SB	Class D. Gold mine. A 3-foot quartz vein along fault between shaly limestone and siliceous shale, trends NW, dips 45°E. Developed by a 300-foot vertical shaft, shallow inclines, and a large open cut. Gold production reported from the oxidized zone. Operated in conjunction with the nearby Belmont mine in 1917 by

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Goldstone(continued)						John Statler, Barstow. Minor lead present in ore. See also Goldstone-Belmont. (Cloudman 19:805-807; Tucker 24:47; 30:238-239; 31: 299; 43b:pl. 7; Wright 53: ap. 40)
	Goldstone-Belmont	John Statler, Barstow (1917) C.W. Troxel, Bishop (1941)	19,29	14N	1E	SB	Class D. Gold-lead mine in the Goldstone District. In addition to gold production, lead ore was shipped in 1917; smelter recovery was 7.54% lead. See also Goldstone.
	Golting	R. L. Golting, Victorville	appr.	6N	4E	SB	Class D, Type 1. Small shipment of ore in 1912 containing 16.50 ounces of silver per ton and 12.20% lead.
	Grand Gorde & Troopers Tunnel	C. A. Devin Los Angeles (1913)					Class D. Shipped small tonnage of high grade silver ore in 1913 also contained 4:68% lead, 15.70% copper, and some gold. (Eric 48:306)
	Grand Reef Claim	R. A. Martin, Oatman, Arizona (1935) Joe Gordon, Parker, Arizona (1940)	appr.	1N	18E	SB	Class D. Gold mine, 14 miles SW of Sablon. Oxidized deposit developed by a 300-foot adit, 25-foot shaft, and 260-foot open cut. Produced 1934-1935, and 1940. Minor lead and copper were also recovered. (Eric 48:306)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
205	Green Gold (Bank Roll, Kieper Lead-Silver, Valentine)	G. B. Conklin, Valley Wells Station P.O. Nipton Operators: Louis F. Kieper, Cima (1930) Wilton & Dunbar, Earp (1939)	30(?)	17N	13E	SB	Class D, Type 2. Located on west slope of Clark Mts., 5½ miles NE of Valley Wells at an elevation of about 6,000 feet. Narrow quartz veins in quartz monzonite, shale and limestone contain discontinuous lenses of galena, sphalerite, chalcopyrite, gold, and silver. Ore bodies occur along fractures in limestone and in quartz monzonite. A fracture striking S 50°E., and dipping 70°NE has been followed by a 285-foot adit and a winze 150 feet from the portal. Cross fractures trending S 30°W., have been followed southwestward from the adit by two drifts; one 30 feet long near the winze, and another 150 feet long from the adit face. About 1500 feet northeast of the glory hole, an ore body 6 inches to 5½ feet wide at the limestone-quartz monzonite contact has been explored by a 30-foot adit and 40-foot shaft. In the southern part of the mine area about 400 feet of prospect adits have been driven eastward through the limestone. Shallow openings along a zone 350 yards long mark the removal of high grade pockets. Some lenses are terminated by faults. Recorded gold-silver-copper production in 1939. Lead-zinc production is not known. (Eric 48:307; Tucker 24:92-93; 30:268; 31:341; 43:484, pl.7; Wright 53:109, ap.79)
	Grey Copper						See Shadow Mountain Group.
	Grey Eagle Group	George R. Seals Victorville (1949)		8N	6E	SB	Class D. Gold-silver mine. Silver Peak, 4 miles west of Highway 395. Mine developed in 1949 by a 50-foot vertical shaft. Gold-silver ore produced containing recoverable lead.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Halberg						See: Mowry. (Storms 93:358-359)
	Hammerback & Patterson						See: Barrett. (Wright 53: ap.25)
	Hard Luck Group	Charles Reat, 3838 Century Road Inglewood (1951) Operators: Frank Baker, Route 1 Barstow (1951)	appr.	14N	7E	SB	Class D, Type 2. Soda Lake district, 9 miles west of Baker. Four claims, Hard Luck No. 1, 2, 3, and 4. Shipped complex ore in 1951 and 1952 to Midvale & Tooele, Utah; average smelter recovery was 6.45 ounces silver per ton, 0.854% copper, 8.20% lead, 2.75% zinc, and some gold.
	Henry	A. Henry, Cima (1913)		16N	13E	SB	Class D. Gold mine. Shipped highgrade gold ore in 1913 also containing 6.55% lead, 6.50 ounces of silver, and recoverable copper. (Eric 48:307)
	Henshaw						See: Murray. (Tucker 31:305)
	Hillside	R. Cowan, Silver Lake (1925) A.A. Aleck, F.L. McClure, Silver Lake (1931)		16N	10E	SB	Class D. Gold mine in Shadow Mt. district, 14 miles east of Valjean. Comprises 3 claims. A 2-foot quartz vein in granite is heavily iron-stained and mineralized with pyrite, chalcopyrite, galena, and visible free gold. Developed by surface trenching and about 60 feet of shaft and drifts. Produced 1924-1925, a small ton-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hillside (continued)						nage of highgrade gold-silver ore also containing 35.30% lead and recoverable copper. See also Canyon mine.(?). (Eric 48:307; Tucker 31:327)
	Hilltop	Frank Czerwonka, P.O. Box 104, Lucerne Valley, and W.F. Dail, Victorville (1952)	21	3N	2E	SB	Class D. Gold mine in Blackhawk district. Developed by a 230-foot adit. Produced gold ore 1947-49 and in 1952. Minor lead-copper recovered in addition to gold silver.
	Hoagland	M. A. Hoagland San Bernardino (1913)					Class D. Small shipment of highgrade gold ore in 1913, containing recoverable lead-silver.
	Hoffman Estate	C. J. McKay, Barstow (1944)					
		Pacific Coast Mill & Mining Company, 1020 Highland Avenue National City (1952)	appr.	8N	1E	SB	Concentrates from old tailings Barstow district, shipped to Garfield and Selby in 1952. Activity in 1944 not determined. Gold-silver-copper-lead recovery. (Eric 48:307)
	Homestake	Harry E. Briggs Trona (1940)		25S	44E	MD	Class D, Type 2. Complex sulfide deposit in Slate Range district, about 35 miles, by road, east of Trona. Recorded intermittent production 1924 to 1940; average smelter recovery 10.40% lead, 0.95% copper, 9.46 ounces of silver per ton, and 0.433 ounce of gold per ton. Reported abandoned in 1940. (Eric 48:307; Wright 53: ap. 77)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hoosier & Missouri	J. W. Foglesong, E. Troutman, Barstow (1930)					Class D. Type 2. Located 12 miles west of Barstow (?). A 15-foot quartz vein on contact between rhyolite and granite, mineralized with gold, silver, copper, and lead. Developed by a 90-foot shaft and 300 feet of drifts. No known production. (Cloudman 19:787; Eric 48:307; Tucker 30:214; 31:273; Wright 53: ap. 77)
	Ibex (Arcturas)	W. Shurtleff, 8721 West Olympic Blvd., Los Angeles 35, (1949) R. W. Busken, Leland Butts, and Leo Butts, Tecopa (1953)		20N	5E	SB	Class B. Type 2. Complex oxidized sulfide body in Black Mts., 6 miles north of Saratoga Springs near Inyo County line. Argentiferous galena, chalcopyrite, and carbonates of lead, zinc, and copper occur in replacement bodies in dolomite along steeply dipping, north trending zones. Developed by shallow shafts and short adits. Zone traceable on surface for about 1800 feet. Elevation at mine about 1300 feet. Recorded production 1901, 1909-1911, 1915-1920, 1936-1949. The most active period was 1915-1920 when the Ibex Springs Mining Company shipped a large tonnage of lead-zinc ore containing about 4.25% lead, 2.76% zinc, and minor silver. Ore shipped during other periods also contained over 1% copper and considerable gold. (Cloudman 19:821-822; Crossman 90:238-239; Eric 48:238; Norman 51:176; Tucker 21:287; 30:277; 31:350; 38:473; 43:481, pl. 7; Waring 19:96-97; Wright 53: ap. 77)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
207	Imperial Lode (Cave Springs, Desert Queen, Mammoth Chief, Meteor, Morning Star, Sampson)	W. W. Tucker, 1425 West Pico Blvd., Los Angeles and Grace Remington, 2500 Glendale Blvd., Los Angeles (1953) Operators: Cave Springs Mining Corporation, Los Angeles (1943) L. A. Raisek, Box 242, Topanga (1951)	25,36	7N	5E	SB	Class D. Type 1. Comprises 3 patented, 3 unpatented claims, 8 miles south of Lavic in the Lava Bed Mts., at an elevation of 4000 feet. A 4- to 18-foot quartz vein in quartz porphyry mineralized with argentite, galena, chalcopyrite and pyrite in a barite, calcite, manganese oxide gangue. Oxidized ore contains cerargyrite and cerussite with secondary enrichment of silver; value reported to 200 ounces per ton. Total underground development is 6000 feet on 2 levels at 50 and 100 feet. Stopes are 5 to 18 feet by 30 to 50 feet. Recorded production 1929-41, intermittent (mainly in 1937). The latest shipment was in 1951; smelter recovery was 5.35 ounces of silver and 2.21% lead. Earlier production was mainly silver. (Crawford 94:376; 96:607; Crossman 90:231; DeGroot 90:529-530; Eric 48:308; Gardner 40:274-275; Storms 93:351-354; Tucker 21:362-363; 30:275-278; 31:347-348, 351, 360; 38:15; 40:244-245; 43b:481, pl. 7; Wright 53:108, ap. 77)
208	Iron Horse (Jack Rabbit)	Tony Marteletti, 524 Linden Street, Las Vegas, Nevada (1942) Lease to: Malcolm L. Huckleberry, and Foster Dawson, 819 North 11th Street, Las Vegas, Nevada (1943)	35	16N	13E	SB	Class C. Type 1. Comprises 2 claims in the Mescal Range of Ivanpah Mts., 3 miles south of Mt. Pass. Oxidized ore containing argentiferous cerussite and some malachite in an iron oxide and calcite gangue. Ore occurs in a vein along bedding plane in limestone, several hundred feet from granite contact. Vein is parallel to contact, strikes north, dips 50 to 60° west and has a maximum width of 10 feet. Developed by a 190-foot inclined shaft, a second shaft, 100 feet to south and open cuts for about 1/4 mile to north along gossan. Apparently same vein as at the Blue Buzzard, 1 mile to

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Iron Horse (continued) (Jack Rabbit)						northwest. Developed by an R.F.C. loan in 1943. Recorded production, 1927 to 1943 intermittent. Average smelter recovery was 12.30% lead, 2.38 ounces of silver per ton, and minor copper and gold. (Eric 48:308; Tucker 43b:131-132, 483, pl. 7; Wright 53:108-109, ap. 78)
	Ivanpah						See: Copper World.
209	J. Juneau	T.W. Craig, Goff, California (1953) Operator: Joe Shupenko, 12436 Glasgow Place Hawthorne, Nevada (1951)	10	11N	19E	SB	Class D, Type 1. Mine located on east slope of small range between Dead Mts. and Piute Range. Galena in quartz vein in metamorphic rocks. Vein strikes N70W and dips 45SW. Developed by a 50-foot incline with 40-foot level; also open cuts. Ore shipped in 1949 and 1951 to Midvale, Utah; smelter recovery was 29.20% lead, 7.50 ounces of silver, and 0.55% copper. (Wright 53: ap. 78)
	Jackpot	Frank Labe, Los Angeles (1941) Operator: H. G. Barnes, Death Valley (1941)	35	13N	12E	SB	Class D. Gold mine located SW of Cima. Developed by a 140-foot shaft and a 60-foot adit. Produced 1936 to 1941. Major activity was in 1941 when about 1500 tons of gold ore was produced. A small shipment of gold concentrates contained about 37.40% lead and recoverable copper in addition to gold-silver. (Eric 48:308; Wright 53: ap. 78)
	Jack Rabbit						See: Iron Horse

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Jackson						See: Stonewall. (Tucker 30:285)
210	Jeff Davis (Sunnyside Lode)	Byron Bluem, Harley Foster, and Robert E. Knepp	22	2N	3E	SB	Class D, Type 1 (?). Located at east end of San Bernardino Mts. Stockwork of shallow dipping quartz veins in an isolated body of schist in limestone is mineralized with argentiferous galena and free gold. Developed by a vertical shaft with a 200-foot connecting tunnel at the 100-foot level; also a winze..Small production reported. (Wright 53: ap. 78)
	Johannesburg Mining & Milling						See; Silver King No. 2.
	Jumbo	J. S. Hyten, Baker (1941) Operators: A.L. Mecham, Baker (1941) Strace Mining Co. (1953)	25	15N	9E	SB	Class D. Gold mine east of Baker in the Solo district. A 4 to 6-foot quartz vein striking N70E, dipping steeply south in schist and gneiss. Developed by a 78-foot shaft and 28 feet of drifts. Produced gold ore 1940-41 containing recoverable lead and silver. (Wright 53: ap. 45)
211	Kalley	D.H. Shire, 6910 Bonsalo Avenue, Los Angeles	31,32	18N	14E	SB	Class D, Type 1. North end of Clark Mts., near State line. Two claims. Galena and sphalerite with minor chalcopyrite in replacement bodies in limestone. First operated in 1917. Shipped lead-zinc ore to Tooele and Midvale 1949-1951; smelter recovery averaged 7.62% zinc,

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Kalley (continued)	Operator: Edward Koppleman, 4457 Simpson Avenue, North Hollywood (1951)					22.90% lead, and minor silver and copper. (Wright 53: ap. 79)
	Kelley (California Rand, Kelley Rand, Frank Royer)	Frank Royer, Red Mountain (1953) Operator: Kelley Gold & Silver Mines (1944-49)	6	30S	41E	MD	Class D. Silver-gold mine in Randsburg district. Comprises 12 patented and 58 unpatented claims, 1½ miles SE of Randsburg at 3695 feet elevation. Siliceous veins in schist. Developed by inclined shafts and thousands of feet of underground workings. Recorded production between 1919 and 1949 of over 200,000 tons of silver-gold ore. Some copper and lead were recovered as a by-product. (Carpenter 19:940-947; Hulin 23:407-411; 25:92-107, 110-121; Newman 23:61, 98-99; Stewart 50:344-345; Tucker 21:361-362; 23:167; 24:48-49; 30:273-274; 31:345-346; 43b:483; Wright 53:135-138, ap. 101)
	Kelley Rand						See: Kelley.
	Kent	G. A. Kent, Ivanpah (1922)		16N	14E	SB	Class D. Silver-gold mine. Small shipment of highgrade silver ore in 1922. Minor copper and lead recovered. (Eric 48:309)
	Kieper Lead-Silver						See: Green Gold.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lady Luck	James A. Bolard, Cima (1944)		15N	14E	SB	Class D, Type 1. Clark Mt. district. Shipped ore during 1944 and 1945; average smelter recovery was 10% zinc, 5% lead and 0.87 ounce of silver per ton. (Eric 48:309; Wright 53: ap.79)
	Last Chance	Andrew Derenzo Box 332 Lucerne Valley (1952)	appr.	2N	3W	SB	Class D, Type 1. Ord Mt. district. Small shipment to Midvale in 1952; smelter recovery was 21.40% lead, 35.10 ounces of silver per ton, and recoverable copper.
212	Lead Capping (Bell Gilroy, Belle McGilroy, C & K)	Jack Rilance Estate Portland, Oregon (1953) Operators: H. Williams, Randsburg (1943) E. J. Tingle, 1005 Maple Street Inglewood (1951) James D. Harley 4325 Gaviota Street, Long Beach (1953)	9	10N	14E	SB	Class D, Type 1. Comprises 3 claims in the Trojan district on east slope Providence Mts., 22 miles NW of Fenner. Argentiferous galena in silicified limestone breccia near contact with intrusive quartz monzonite. Developed by short adits. Produced 1913, 1946, and 1949-50. Average smelter recovery on last ore shipped was 2.76% lead, 7.96 ounces of silver, and recoverable copper. First ore shipped in 1913 contained 23.90% lead, 45.60 ounces of silver, 1.50% copper, and 0.158 ounce of gold per ton. (Cloudman 19:827; DeGroot 90:532; Eric 48:299; Tucker 21:360; 30:268-269; 31:341; 43:475, pl.7; Wright 53:103, ap. 73)
213	Lead Mountain	Pacific Base Metals 727 Subway Terminal Bldg. Los Angeles (1943)	36	10N	1W	SB	Class D, Type 1. Comprises 640 acres of patented land in the Grapevine district 5 miles NW of Yermo. A 100-foot fissure 1300 feet long in tuff and andesite porphyry is mineralized with galena and associated cerussite and cerargyrite in a gangue of quartz, crystalline barite, iron oxides, and manganese oxides. Deposit was worked for barite 1931-33 by Pacific Minerals Company.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lead Mountain (continued)	Operator: Pacific Minerals Co., (1931-33)					Developed by a 1300-foot tunnel, 210-foot, 33-degree incline, and a 245-foot winze which connects shaft to tunnel. No known production of lead-silver. (Tucker 24:199-200; 30:279, 298; 31:351-352, 372; 40:245; 43b:484, 509, pl. 7; Wright 53: ap.79)
	Leadville	R. A. Martin, Box 168 Oatman, Arizona and Robert Lyons, Kingman, Arizona (1925) Operator: Lynch & Turnbull Vidal, California (1925)	appr.	2N	25E	SB	Class D, Type 1. Whipple Mts. Small shipment of ore in 1925; smelter recovery was 30% lead.
	Leastalk (Leastock)	Leastalk Gold and Copper Mining Co., L. M. Gregory, Mgr. 500 Frost Bldg., Los Angeles (1919)	appr.	15N	16E	SB	Class D. Gold prospect in the Northern New York Mts. Vein in limestone intruded by granite is mineralized with silver-gold-lead. Developed by two 150-foot shafts and about 200 feet of drifts. No known production. (Aubury 08:330, 336; Cloudman 19:787; Eric 48:310; Tucker 30:215; 31:274; Wright 53:ap. 15)
	Leiser Ray						See: California Comstock. (Wright 53: ap.74)
	Lily	Charles Johnson, Nipton		16N	14E	SB	Class D, Type 1. Lead-silver mine in New York Mts. Shipped ore in 1941; smelter recovery was 1.70% lead, 0.80 ounce of silver per ton, 0.143 ounce of gold per

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lilly (continued	Operator: Walter J. Sparkman, Nipton (1941)					ton, and recoverable copper. (Eric 48:310)
	Live Oak	L. J. Spear, Barnwell (1912)					Class D, Type 1. Small shipment of ore in 1912; smelter recovery 10.20% lead and 24 ounces of silver per ton.
	Lopez	Irene Lopez, Kelso (1913)					Class D, Type 1. Small shipment in 1913; smelter recovery was 30.30% lead, 3 ounces of silver per ton, and 0.04 ounce of gold per ton.
	Lost Mormon	Lost Mormon Mining Co., Long Beach (1938)		14N	16E	SB	Class D. Gold mine in New York Mts. Small shipment of high-grade gold ore in 1937-38; smelter also recovered 9.47% lead, 2.30% copper, and 10 ounces of silver per ton. (Eric 48:310; Wright 53: ap. 79)
	Lost Spanish						See: Old Spanish Victory.
	Louise						See: Louise mine. Riverside County.
	Louisiana-California						See: California Comstock.
	Lucky	J. E.Stevenson Los Angeles (1939)	11	12N	10E	SB	Class D. Gold mine on north slope of Old Dad Mt. Oxidized deposit developed by short adits. Ore occurs on limestone-granite contact. Produced about 1270 tons

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Lucky (continued)	Operator: J. L. Smith, Baker (1942)					of gold ore between 1932 and 1935. Minor copper, lead, and silver also recovered. (Eric 48:310; Wright 53: ap. 47)
214	Lucky Jim	E. J. Morath 521 Walnut Street Long Beach (1930)	26	18N	8E	SB	Class D, Type 2. Mine located 20 miles north of Milligan. Oxidized deposit. Ore shipped 1929-1930 contained 84.50 ounces of silver per ton, 2.8 percent copper, minor gold, and recoverable lead. (Eric 48:310)
215	Lucky Jim	Mrs. James Menter P.O. Box 892, Hollywood	30 25	6N 6N	18E 17E	SB SB	Class D, Type 2. East slope Old Woman Mts. Quartz vein 4 feet wide in granite contains chalcopyrite, galena, cerussite, argentite, and cerargyrite. Developed by a 200-foot shaft, 500-foot crosscut, and over 300 feet of drifts. Reported production of $35,000 between 1911-1930. (Eric 48:310; Tucker 30:215-216; 279-280; 31:274-275; 43b:pl. 7; Wright 53: ap. 102, 103)
	Lucky John	Andrew Derenzo, Box 485, Lucerne Valley (1952)		3N	2W	SB	Class D, Type 1. Ord Mountain; Bellville district. Mine adjacent to Last Chance. Small shipment to Selby in 1952; smelter recovery was 33.33% lead, and about one ounce of silver per ton.
	Lucy Gray	Lucy Gray Mining Co. Nipton (1941)		16N	17E	SB	Class D. Gold-silver mine. Produced 1913 to 1916, and in 1941. Smelter also recovered about 2.9% lead and some copper. (Eric 48:311)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mabel	Walter Zindell, Box 71, Essex, California (1934) Operator: Grey Eagle Mining Co. Danby (1935)	3,10, 11	5N	17E	SB	Class D. Gold mine in the Old Woman Mts. Gold associated with galena and chalcopyrite in quartz veins in granite. Developed by a 110-foot inclined shaft, 700-foot tunnel, winzes, and drifts. Produced about 221 tons of gold-silver ore containing recoverable lead and copper, 1932 to 1935. May be part of the Gemco mine. (Eric 48:311; Wright 53: ap.80)
	Mabel Contention						See: Big Horn.
	Macedonia (Columbia)	Mrs. R. P. Greenleaf 450 South Harvard Los Angeles (1943) Operator: Eau Claire Ore Co. (1938)	3	11N	14E	SB	Class D. Comprises 4 unpatented gold claims, 6 miles SE of Dawes in the Slate Range district. Two parallel veins up to 6 feet in width, about 80 feet apart, occur in quartz monzonite. Ore minerals are pyrite, chalcopyrite, galena, and sphalerite with gold and silver. Developed by a 320-foot inclined shaft with 3 levels; a 20-foot tunnel, and a 45-foot winze. Produced about 142 tons of gold-silver ore containing recoverable copper and lead. (Eric 48:303,311; Tucker 21:340; 30:275; 31:348; 43b:447, pl. 7; Wright 53:ap. 75)
	Maddux Lead	Harry Maddux, San Bernardino (1949)	appr.	3N	25E	SB	Class D, Type 1. Whipple Mt. district. Small shipment to Wickenburg in 1949; recovery 15% lead and about 2 ounces of silver per ton.
	Mammoth						See: Imperial Lode. (Wright 53:ap. 77)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mammoth Chief						See: Imperial Lode. (Wright 53: ap. 77)
	Mansfield	O.D. Mansfield Hallock, California (1918)					Class D, Type 1. Shipped to smelter in 1918; recovery 17.60% lead, 29.10 ounces of silver per ton, 0.67 ounce of gold per ton, and recoverable copper. (Eric 48:311)
	Mariposa Queen	Mulligan Queen Oil Co. Mulligan, California (1915)		3N	17E	SB	Class D. Silver mine. Produced 1913-1915. Silver ore shipped contained up to about 5% copper and about 5.20% lead. (Eric 48:311)
	McGilroy						See: Bell Gilroy. (Eric 48:311; Wright 53: ap. 80)
	Meteor						See: Imperial Lode. (Crawford 96:607; Crossman 90:231; DeGroot 90:529-530, Storms 93:353-354; Wright 53: ap. 77, 78)
	Minetta	Grimm & Sexton, Trona (1917)	appr	25S	44E	MD	Class D, Type 1. Shipped lead-silver-gold ore in 1917. (Eric 48:311)
216	Mitchell	J. E. Mitchell Essex, California	21	10N	14E	SB	Class D, Type 1. Comprises 8 claims on the east slope of the Providence Mts. 23 miles NW of Essex at an ele-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mitchel (continued)	Lease to: I. F. Crosby, 1711 South Kingsley Drive Los Angeles (1953)					vation of 4400 feet. Fissures 2 to 6 feet wide in limestone, strike N 30°W and dip steeply west, are mineralized with galena and cerussite. Developed by a 250-foot adit, 150 feet below outcrop; also open cut. About 250 tons of 15% lead ore is reported on the dump. Silver content is about 5 ounces per ton. (Tucker 43b: 485, pl. 7; Wright 53: 110, ap. 80)
217	Mohawk	Ivanpah Copper Co. Los Angeles Lease to: Mohawk Mines Inc., Nevada Sub lease: S. D. Greenwood, et al. Valley Wells, via Nipton (1953)	7,8, 17,18	16N	13E	SB	Class B, Type 1. Comprises 9 claims, 6 patented and 3 unpatented, on Mohawk Hill, south slope of Clark Mt., 24 miles north of Cima at an elevation of 4500 feet. A series of parallel fissures at contact of gray and blue limestone near granite contact. Galena, sphalerite, and chalcopyrite, partially oxidized, occur in a 20-to 30-foot zone along contact and in fissures and stringers near contact. Iron and manganese oxides are prominent in the gangue. Developed by 3 adits. Total underground development about 2500 feet. Recorded production 1918 to 1952, intermittent. Ratio of lead to zinc about 2 to 1 during earlier periods of production. Last ore shipped was lead-silver ore; smelter recovery was 12% lead, 4.92 ounces of silver, 0.50% copper and minor gold. (Aubury 08:328; Eric 48:312; Tucker 21:363; 30:216, 280; 31:275, 353; 43b: 485-486, pl. 7; Wiebelt 49; Wright 53:110-111, ap. 80)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mulcahy	J. E. Mulcahy, Daggett (1911) J. B. Mulcahy, 998 Fourteenth Street, San Bernardino (1953)	appr.	10N	1E	SB	Class D. Type 1. East Calico district. Oxidized silver-lead ore in siliceous gangue along a 10- to 30-foot by 30- to 150-foot brecciated zone. Developed by a 50-foot and a 150-foot adit; also open cuts. Small shipment in 1911; smelter recovery 5.42% lead and 67.70 ounces of silver per ton. Reported shipping 200 tons to AS & R in 1934. (Wright 53: ap. 103)
220	Murray (Henshaw, Gold Point)	J. Murray, Silver Lake (1911) Halcomb Bros. & Phoebe Henshaw (1931) Lease to: Murray Mining Co., 502 Security Title Insurance Bldg. Los Angeles (1931) Abba Gold Mining Corporation, Max E. Socha, 738-8th Street, San Bernardino (1953)	1	3N	1W	SB	Class D. Type 1. A total of 8 claims on the north slope of San Bernardino Mts., 27 miles SE of Victorville at an elevation of 4300 feet. A 4 to 6-foot quartz vein on contact between brecciated dolomite and granite; strike NE, dip 35° SE. Developed by 2 adits, 200 and 600 feet long. Shipped ore in 1911 containing 15.62% lead, 51.40 ounces of silver per ton, and minor copper and gold. (Eric 48:312; Tucker 30:245; 31: 305-306; 43b: 453, pl. 7; Wright 53: ap. 38, 49)
	Myers	W. N. Myers, Trona (1921)	appr.	25S	45E	MD	Class D. Silver mine in the Trona district. Milled 300 tons of silver ore in 1921 producing 5 tons of concentrates containing recoverable lead and gold in addition to silver.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
218	Mohawk Group	F. L. Tomlinson, Big Bear Lake Lease to: Universal Industries Inc., Max L. Meyer, sec., 8366 Blackburn Avenue, Los Angeles (1943)	22,23, 27	3N	1E	SB	Class D (?), Type 1. Comprises 9 claims located near west rim of Cushenbury Canyon, 1 mile west of Whiskey Springs, 6 miles NE of Big Bear Lake Post Office at an elevation of 6500 to 6800 feet. Vein at granite-dolomite contact has a maximum width of 15 feet and averages 6 feet. Galena, pyrite, chalcopyrite and sphalerite occur in irregular lenses in an iron oxide gangue. Zone persists laterally for at least 1000 feet parallel to the limestone bedding. Developed by 2 adits on levels 300 feet apart. High lead-zinc-silver assays reported. Production not determined. (Eric 48:305, 311: Tucker 43b:69, 486-487, pl. 7; Wright 53:111, ap. 80, 81)
	Morango						See Cactus Flat. (Crossman 90:288; De Groot 90:522; Irelan 88:503; Tucker 30:280; 31:353; Wright 53: ap. 81)
	Morning Star						See: Imperial Lode. (Crossman 90:231-232; Storms 93: 353; Wright 53: ap. 81)
219	Mowry (Gladstone & Halberg)	Roy M. Mowry, 7011 Passaic Street Huntington Park (1953) Operators: Mowry Mines Company D. G. MacGregor, pres. Haynes, California	35	7N	5E	SB	Class D (?), Type 1. Comprises 12 claims in the Lava Bed district, 9 miles SW of Lavic at an elevation of 4000 feet. A crushed zone 7 to 30 feet wide along a NW fault in quartz porphyry is mineralized with galena, chalcopyrite, gold and silver. The ore is partially oxidized. Developed by 4 shafts, 100 feet to 250 feet deep, and 2 adits, 105 and 310 feet long. Zone extends for 3000 feet along strike. Production not determined. (Crawford 96:321; Storms 93:358-359; Tucker 30:280-281; 31:353-354; 40:245-246; 43b:486, pl. 7; Wright 53: ap. 81)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	New Era (New Era Mining Company)	Adolph Hansen, Cima (1929)		15N	13E	SB	Class D. Type 2. Ivanpah Mountains. Shipped ore between 1914 and 1929 containing 10.40% lead, 2.50% copper, 6.48 ounces of silver per ton, and 0.156 ounce of gold per ton. (Eric 48:312; Wright 53: ap. 81)
	New Era Mining Company						See: New Era.
	New Harmony	Cima Commercial Trust Company, Cima (1921)		15N	13E	SB	Class D. Type 1. Ivanpah Mts. Shipped ore during 1921; average smelter recovery was 1.02% lead, 7.47 ounces of silver per ton, and minor copper and gold. (Eric 48:312)
	New Sutherland Divide	New Sutherland Divide Mining Company, Manix (1945)	appr.	10N	1E	SB	Class D. Type 1. Calico district. Shipped ore during 1944 and 1945; average smelter recovery was 16% lead, 7.02 ounces of silver per ton, and minor copper and gold.
	New York						See: Sagamore (Eric 48:312)
	Nichols		appr.	2N	3E	SB	Class D. Type 1. Lead-silver-zinc mine in the Morongo district, east end San Bernardino Mts. A 12-foot vein striking NE was developed by 4 shafts, 20 to 100 feet deep. No recorded production. Long idle.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Nichols (continued)						(Cloudman 19:800; De Groot 90:526; Tucker 30:245-246; 31:306; Wright 53: ap. 81)
	Nigger Mtn.						See: Mohawk Group
	North Valley View	K. L. Stores, Barstow (1936)	appr.	6N	4E	SB	Class D, Type 1. Silver Mt. district, 5 miles east of Oro Grande. Developed by a 300-foot shaft and connecting tunnel in 1936. Ore shipped during the same year contained 2.77% lead, 25.90 ounces of silver per ton, and 0.23 ounce of gold per ton.
	Odessa						See: Calico-Odessa (Eric 48:313)
	Old Dominion (Ortega)	V. Anderson and Earl Fremont (1943) Lease to: Frank L. Shaw	31, 32	7N	6E	SB	Class D. Gold mine located 12 miles west of Ludlow. Developed by a 30-foot shaft, 70 foot tunnel, and large open cut. Produced about 115 tons of gold ore 1936 to 1940, and in 1943. Silver, copper, and lead also recovered. (Eric 48:313)
	Old Ivanpah Copper						See: Copper World.
	Old Pete (Yim-Wheelock)	Lee Yim and William Wheelock Estate, Ludlow (1953)	33	7N	8E	SB	Class D. Gold mine in the Stedman district south of Ludlow. Specular hematite with free gold in brecciated dacite porphyry along quartz-monzonite contact. Partially oxidized deposit. Developed by 50x30x40 foot open cut, 100-foot adit driven west from open cut, and 60-foot

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Old Pete (continued) (Yim-Wheelock)	Operator: J. H. Miller, Ludlow (1940)					adit driven south. Recorded production 1933-1934, and in 1940, about 2585 tons of gold ore; smelter also recovered silver, copper, and lead. (Eric 48:313; Gardner 40: pl. 2; Tucker 34:310,325,326; 40:240; 43b:456-457, pl. 7; Wright 53: ap.50,51)
	Old Rose	Red Corral Mining Co. 610 South Broadway Los Angeles 14, Calif. (1952)	appr.	3N	1E	SB	Class D, Type 1. Holcomb district, vicinity of Bear Lake. Shipped ore to Tooele, Utah in 1952; smelter recovery was 24.82% zinc, 11.32% lead, and minor silver.
221	Old Spanish-Victory-Dreamer Group (Lost Spanish)	Frank Kuonen, 1501 West 11th Street, Santa Ana, California (1951)	28	2N	3E	SB	Class D, Type 1. Rattlesnake Gulch, 16 miles from Yucca, in the Morongo district. Narrow quartz vein mineralized with argentiferous galena, sphalerite, and lead and zinc carbonates. Developed by a 60 foot and a 25-foot inclined shaft. Small ore shipment in 1951; smelter recovery 19.52% lead, 2 ounces of silver per ton, and minor zinc. (Wright 53:ap. 80)
	Ord						See: Ord Mountain
222	Ord Mountain (Brilliant, Ord, Osborn, Rio Vista)	Harney J. Stevenson 1231 Sunset Playa Drive, West Hollywood (1953)	12,13 24	7N	1E	SB	Class D, Type 2. Comprises 28 claims, 8 of which are patented. Located on the west flank of Ord Mts., 14 miles SE of Daggett at an elevation of 4000 to 5500 feet. A series of NW trending, NE dipping veins along shear zone in andesite. Zone traceable for 2 miles, has maximum width of 250 feet along contact with quartz-monzonite. Ore occurs in discontinuous bodies of chalcopyrite,

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Ord Mountain (continued) (Brilliant, Ord, Osborn, Rio Vista)						pyrite, and gold, with minor galena in a quartz-barite gangue. Developed by a 200-foot, 70-degree incline on the Brilliant claim, a 500-foot adit; 100-foot shaft and a 30-foot shaft on the Josephine claim; a 400-foot adit with the 200-foot winze on the Belgium claim; a 200-foot adit with 65-foot crosscut on the Copper Junction claim, and 3 crosscut tunnels on the Rio Vista claim. Produced 1929 and 1943 about 482 tons of copper-gold ore containing recoverable lead-silver. (Aubury 08:336; Cloudman 19:789; Crawford 94:234; 96: 51, 326; De Groot 90: 528; Eric 48:313; Tucker 30:217-218; 31:276-278; 40:239; 43b:133,435,436; Wright 53: 66-67, ap. 17, 51)
	Oriental & Red Cloud						See: Zenda
	Oro Plata						See: Cerro de la Plata (Wright 53: ap. 75)
	Ortega						See: Old Dominion
	Osborn						See: Ord Mountain
	Owl Canyon	J. A. McCaskell 321 Felt Bldg., Salt Lake City, Utah (1925)	appr	17N	10E	SB	Class D, Type 1. Shadow Mt. district. Shipped ore in 1925 containing 25% lead, 4.43 ounces of silver per ton, 0.01 ounce of gold per ton, and recoverable copper. (Eric 48:313)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	P & D	Scott Price, Parker, Arizona (1911)					Class D. Shipped 70 tons of high grade silver-gold ore in 1911; smelter also recovered 1.0% copper and 2.43% lead. (Eric 48:314)
	Pacific						See: Bagdad-Chase
223	Pay Checker	**Leonard G. Ellis, Star Route,** Oro **Grande** (1951)	9	6N	2E	SB	Class D, Type 1. Located on the west slope of East Ord Mt. Prospect developed by a small open cut. Made a small shipment to Selby in 1950; recovery 11% lead, 4.42 ounces of silver per ton, and minor copper.
	Pay Day	A. G. Workman, Cima (1951)	appr.	13N	12E	SB	Class D, Type 1. Providence district, 13 miles SW of Cima. Prospect developed by an open cut. Small shipment to Selby in 1951; smelter recovery 10% lead, 4 ounces of silver per ton, and minor copper.
224	Pat Maloy	E. A. Reineith, Ludlow, (1926)	36	7N	5E	SB	Class D, Type 1. Mine developed by a 14-foot tunnel and 15-foot shaft. Small shipment to smelter in 1926; recovery 46.12% lead and 4 ounces of silver per ton.
225	Pedry	William Hile, Nipton (1953) Lease to: Fred Santchi, Bagdad (1953)	6,7, 18	10N	2W	SB	Class D, Type 1. Comprises 6 patented claims, 4 miles NE of Hinkley School. A 2-to 10-foot quartz vein outcrops discontinuously for about a mile in a NW direction and dips 70 E. Country rock is felsite and quartz latite on the southern claims, granite and granite gneiss on the northern claims. Vein at surface is brecciated and vuggy, heavily iron-stained, and contains calcite and barite gangue. Ore minerals are pyrite, chalcopyrite, galena,

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Pedry (continued)						and sphalerite, oxidized to about 200 feet. The chalcopyrite occurs only in the northern section toward the granite. Developed by a 200-foot shaft, a 270-foot shaft, and about 45 prospect pits along vein between shafts. Water was encountered at 250 feet. No production. (Wright 53:111-112, ap. 82)
	Perseverance (Silver King)	Eltistie, Rohr, & Richards, Goffs, California (1920)	34	11N	14E	SB	Class D. Silver mine in the Providence district, 22 miles NW of Fenner. Comprises 12 claims. Lenses of argentiferous galena with cerussite and cerargyrite in Paleozoic limestone. Ore bodies trend N 25°to 40°E, and dip steeply SE. Developed by 162-foot shaft with 3 levels; also open cuts. Small tonnage of silver-gold ore produced in 1918 and 1920 containing from 3 to 10% lead and recoverable copper. (De Groot 90: 532; Eric 48:314; Tucker 21:364-365; 30: 281; 31:354; Wright 53: ap. 83,84)
	Peterson	Peterson Lease Maruba, California (1917)					Class D, Type 1. Shipped lead-silver-copper ore during 1917; average smelter recovery was 3.56% lead, 0.7% copper, and 3.27 ounces of silver per ton. (Eric 48:314)
	Pilot	A. W. Eaton, Goffs (1916)	appr.	9N	14E	SB	Class D, Type 1. Providence Mts., adjoining Bliss Providence Gold mine. Has been incorrectly cross-filed with the Frisco Group. Shipped ore in 1916; smelter recovery was 31.50% lead and 28.40 ounces of silver per ton. (Cloudman 19:828; Eric 48:314; Wright 53: ap. 53)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
226	Piute	R. W. Crampton, Cima (1919) Henry Mulheisen, Fenner. (1931)	26	9N	18E	SB	Class C, Type 2. Comprises 10 claims on the west slope of the Piute Mts., 6 miles from Fenner at an elevation of 2800 feet. Quartz lenses along fissure in gneissoid granite are mineralized with chalcopyrite, galena, and sphalerite. Developed by a 200-foot vertical shaft, 2000 feet of tunnels, drifts, and adits. Produced 1915 to 1919; average smelter recovery was 16.58% zinc, 5.10% lead, 8.14% copper. Gold-silver ore was shipped separately. (Tucker 31:310; Cloudman 19:816; Eric 48:314; Wright 53, ap. 82)
	Portland	E. Carlson & A. Kendall, Searchlight, Nevada (1908)					Class D, Type 2. Small shipment of complex ore in 1908; smelter recovery was 11.10% lead, 1.02% copper, and 15.65 ounces of silver per ton. (Eric 48:315)
227	Providence	P. Thibedeau, Kelso (1931)	32	10N	14E	SB	Class D, Type 1. One claim in the Providence Mts., 7 miles east of Hayden. Shaft sunk 300 feet on limestone-diorite contact, and developed on 3 levels. Shipment of ore in 1918 contained 10.25% lead, 0.69% copper, and 37.10 ounces of silver per ton. (Eric 48:315; Tucker 30:281-282; 31:354; Wright 53: ap. 82)
	Rainbow	V.A. & R.B. Perry, Cima or 5352 Geer Ave. Los Angeles (1950)	appr,	13N	12E	SB	Class D. Gold mine located 10 miles west of Cima. Developed by a 65-foot, 39-degree incline with 100 feet of drifts; also a 200-foot tunnel. Produced about 134 tons of gold ore, 1935-1941, and in 1950. Minor lead and cop-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Rainbow (continued)						per also recovered.
228	Rainy Day	Jerry Korfist, Baker (1953)	27	13N	11E	SB	Class D, Type 1. Northeast of Old Dad Mts. Lead-gold-silver in limestone; developed by a shallow shaft and two short tunnels. (Wright 53: ap. 82)
	Ramsey (Wheeler)	Ramsey Mining Co. Lucerne Valley, California (1942)	2,3	3N	2W	SB	Class D. Gold mine in the Bellville district; San Bernardino Mts. north of Big Bear Lake. Quartz veins associated with diorite dikes in granite are mineralized with pyrite, chalcopyrite and minor galena. Developed by several thousand feet of underground workings including an inclined shaft and several adits. Equipped with a 25-ton cyanidation plant now dismantled. Last worked 1937-1942 during which time about 2880 tons of gold ore were treated. Concentrates shipped contained recoverable copper and lead. (Eric 48:315; Tucker 40:72-73; 43b: 458-459, pl. 7; Wright 53: ap. 54)
	Red Bridge						See: Big Four.
	Red Jacket	Algerman Del Mar, Victorville (1934) M. Mulcahy, Daggett (1920)		2N	2E	SB	Class D. Silver mine in the Blackhawk district, San Bernardino Mts. Two claims, the Aviation and Silver King. Oxidized deposit; developed by a 150-foot shaft, 40-foot tunnel, and 60 feet of drifts. Produced 1920 to 1934, about 538 tons of silver ore containing recoverable gold, copper, and lead. (Eric 48:315; Wright 53: ap. 82)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Red Raven						See: Anaco.
229	Riggs	F. Riggs, Silver Lake (1915) W.B. Turner, Long Beach (1943)	2	16N	8E	SB	Class D. Type 1. West Silurian Hills north of Baker. Comprises 4 claims, 1½ miles east of Riggs at an elevation of 1800 feet. Native silver and cerargyrite occur with cerussite and galena in irregular lenses up to 4 feet wide along a series of parallel faults in limestone. Developed by 3 adits, 25, 150 and 165 feet long, 280 feet of drifts and a 1700-foot crosscut. Recorded production 1914-15, 1918, 1931; mainly silver, some lead, copper and gold recovered. (Eric 48:297; Tucker 21:359; 30:267; 31:340; 43:474, pl. 7; Wright 53: ap. 105)
	Rio Vista						See: Ord Mountain.
	Roberts	C. A. Roberts, Silver Lake (1918)					Class D. Type 1. Small shipment of ore in 1918; smelter recovery was 17.50% lead and 3.44 ounces of silver per ton.
	Ross	R. B. Gill, 1020 North Coronado St., Los Angeles, and J. E. Ginn, Cima (1927)		15N	13E	SB	Class D. Type 1. Ivanpah Mts. Small production of silver-lead ore in 1926-27; smelter recovery 19.15% lead, 14.16 ounces of silver per ton, 0.0835 ounce of gold per ton, and recoverable copper. (Eric 48:316; Wright 53: ap. 82)
	Ryerson	H. C. Ryerson, Daggett (1921)					Class D. Type 1. Produced silver in 1911 by direct recovery. Shipped ore in 1920 containing 21.15% lead, 73.80 ounces of silver per ton, and some gold.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
230	Sagamore (New York)	California Sulfur Co. Ivanpah (1944) Ivanpah Copper Co. L. D. Godshall, 722 South Oxford Street Los Angeles (1951) Operator: Claremont Mining Co., 336 West 2nd Street Claremont, Calif. (1952)	33,34	14N	16E	SB	Class C, Type 2. Comprises 7 patented and 24 unpatented claims on the south slope of New York Mts., 17 miles south of Ivanpah at an elevation of 6300 to 7500 feet. Quartz veins 4 to 14 feet wide in quartzite are mineralized with galena, chalcopyrite, sphalerite, and hubnerite. Development work to 1952 consists of adits 1100, 550, and 600 feet long, shafts 150, 100, and 50 feet deep In 1952, 100 feet of drifting from main shaft developed a 4-foot vein assaying 2 ounces silver, 2.60% lead, 3.64% zinc, 0.10% copper, and 0.82% WO_3. Recorded production 1907-08, 1917, 1942-45, and 1951. Shipping grade ore showed an average smelter recovery of 2.84% zinc, 19.85% lead, 4.66% copper, 17.50 ounces of silver, and some gold In 1951 separate lead, zinc, and copper concentrates were made in an attempt to establish a milling procedure. (Aubury 05:251; 08:331-333; Cloudman 19:788,790; Eric 48:316; Jenkins 42:350; Partridge 41:308; Tucker 30: 217,220; 31:276,279; 43b:67-68, 436-437, pl. 7; Wright 53: 67-68, ap.19)
	Sampson						See: Imperial Lode (Crawford 96:509; De Groot 90: 529-530; Storms 93:353; Wright 53:ap, 83)
	Santa Fe (Arlington, Blackhawk)	James Hay Estate 8517 West 3rd Street Los Angeles	5,8, 9,16, 17	3N	2E	SB	Class D. Group of 175 gold claims on the east slope of San Bernardino Mts, 35 miles SE of Victorville at an elevation of 4200 to 6700 feet. First located in 1887. Free gold associated with minor galena, chalcopyrite, and pyrite occurs in brecciated limestone of the Santa Fe

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Santa Fe (continued)	Operators: Santa Fe Gold Mines Inc. 55 Liberty St. New York (1940-42) Beverly Oil Company Lucerne Valley (1942)					thrust fault overlying granite. The thrust is exposed for $1\frac{1}{4}$ miles in Blackhawk Canyon. The bulk of ore produced was cyanided and large low grade reserves are present. High grade ore in a hematite gangue was shipped to Selby in 1934 and 1940; copper and lead were recovered as a by-product. About 40,000 tons were cyanided between 1921 and 1942. (Bailey 02:6; Cloudman 19:797-799; Crawford 94:230; 96:34,320, 327; Crossman 90:266; De Groot 90:523-525; Eric 48:316; Newman 23:742; Storms 93:364-365; Tucker 30:222-226; 31: 282-286; 40:74-78; 43:440, 460-461, pl. 7; Woodford 28:265-304; Wright 53:80; ap. 56)
231	Scotty Wilson	D. F. Gleber 1036 Ferris Avenue Los Angeles Lease to: Phillip Barnes, Box K, Big Bear Lake (1941)	4	2N	1E	SB	Class D, Type 1. Van Dusen Canyon $2\frac{1}{2}$ miles NW of Big Bear City. Comprises 2 placer and 2 lode claims. Gouge zone along fault trends S 60 E, dips vertically in limestone. Mineralized zone has a maximum width of about 30 feet, contains irregular pods of galena, pyrite, sphalerite and some pitchblende in brecciated limestone blocks. Developed by a 30-foot vertical shaft and south trending adit which are now caved. Late development (1950) consists of a 50-foot vertical shaft from which a 20-foot and a 50-foot crosscut from the 25 and 50-foot levels were driven to the fault zone. Mineralized limestone was found on the 25-level but not on the 50-level. No known production; idle in 1951. (Wright 53:112, ap. 83)
	Semi-Tropic	H. Santag, Upland (1906)					Class D. Shipped small amount of gold ore in 1903, also contained 8.40% lead. Milled gold ore in 1906.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
232	Shadow Mountain Group (Grey Copper)	Paul McKenry, Nipton (1947) Edna McKenry, Nipton (1951) Operators: Shadow Mt. Mines Co. (1950)	15,16	17N	11E	SB	Class D. Type 2. Shadow Mountain district, 15 miles north of Valley Wells. Comprises 26 claims, the Balboa Group of 6, the Yucca Lilly Group of 10, and the Gold Hill Group of 10. Shattered zone in diorite gneiss contains oxidized copper, lead, and silver minerals; also gold. Developed by a 100-foot vertical shaft and several hundred feet of horizontal workings. Separate copper and lead shipments were made to Midvale and Selby in 1947-50, and 1951. Smelter recovery on last lead shipment was 17.20% lead and 20.40 ounces of silver per ton. Copper ore shipped contained about 4.30% copper plus lead, gold and silver. (Tucker 43:434, pl. 7; Wright 53: ap. 11)
233	Silver Bell	Rare Metals Corp., Mrs. O. J. Bellamy, President, Inglewood, (1943)	12	7N	4E	SB	Class D. Type 1 (?). Comprises 8 claims on the north slope of Lavic Mountains, 17 miles SE of Newberry at 3000 feet elevation. Series of parallel north-trending fractures in amygdaloidal basalt. Lead-silver-gold mineralization reported. Developed by a 1050-foot adit. No known production. (Tucker 30:282-283; 31:355-356; 40:246; 43:487, pl. 7; Wright 53: ap. 83)
	Silver Bell	Frank Wiess, Byran Bean, Nipton (1948)	appr.	17N	13E	SB	Class D. Type 2. Clark Mountain district. Shipped copper ore and lead ore in 1948. Copper ore contained 4.86% copper, lead ore 8.75% lead. Appreciable gold and silver also recovered.
	Silver Belt	J. Andra, Trona (1915) Jess Knight, Goodsprings, Nevada (1917)	appr.	25S	44E	MD	Class C. Type 1 (?). Shipped highgrade silver ore during 1914; milled gold-silver ore in 1915 and shipped large tonnage of lead-silver ore in 1917. Smelter recovery on shipments in 1917 averaged 20% lead and 5 ounces of silver.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Silver Bow	Arthur Krunze, Daggett (1923) J. F. Reber, 3125 Arrowhead Avenue, San Bernardino (1953)	9	10N	1E	SB	Class D. Silver mine in the northwest end of the Calico district. Moderately dipping 3-foot vein of silver-lead ore in a barite gangue. Developed by a 230-foot 50-degree incline and 500 feet of drifting. Vein faulted off at lower levels. Shipped silver-lead ore and high-grade gold ore 1922-23. Smelter recovery on the silver-lead shipment was 11.47% lead, and about 163 ounces of silver per ton. (Wright 53: ap. 106)
234	Silver Cliff (Silver Reef)	W. C. Buehler, Wesley N. Rowe, Betty Jean Mullinix, 1555 Sunset Avenue, Pasadena (1951) Operator: Silver Cliff Mining Company, Frank A. Humphrey, Pres., Los Angeles (1943)	18	7N	5E	SB	Class D. Type 1. Comprises 19 claims on NE slope of Newberry Mountains, 18 miles SE of Newberry at 4000 feet elevation. Silver-lead ore occurs along north-trending fissures in limestone. Developed by a 376-foot shaft and a 150-foot, 75-degree incline. No known production. (Tucker 30:283-284; 31:356-357; 43:487-489; pl. 7; Wright 53: ap. 83, 84)
235	Silver Dream (Tip Top)	R. A. Saviers, Box 3, Big Bear City (1953) Lease to: J. L. Harper, 406 N. Ardmore, Los Angeles (1951)	17	2N	3E	SB	Class D. Type 1. One claim near crest of Tiptop Mountain, 11 miles east of Big Bear City. Irregular mineralized zone in massive limestone (Furnace formation) bordered on north by mica schist. Zone 60 by 250 feet strikes NW, dips N, paralleling bedding. Galena is in 5-inch stringers with heavy iron-stained halos. Developed by 2 shafts, each less than 30 feet deep; also trenching in 1951. Only known production was 1 ton of silver-lead ore in 1941. (Wright 53: 112-113, ap. 83)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Silver Giant	Silver Giant Mine, Silver Lake (1925)	appr.	17N	11E	SB	Class D. Type 1. Shipped 1 ton of silver-lead ore in 1925; recovery 20 ounces of silver and 957 pounds of lead.
	Silver Hill (Annex)	George Peterson, Albert E. Barton Operator: California Silver Corporation, 9814 Washington Blvd., Culver City (1951)	26,27	17N	8E	SB	Class D. Silver mine. Four claims in Silurian Hills near Riggs. Silver and lead mineralization in veinlets in dolomite and quartzite of the Crystal Springs formation, which is in fault contact with granite. Zone of veinlets in gouge and dolomite breccia strikes N 36° W, dips 50° S, and has a miximum width of 10 feet. Developed by open cuts. Shipped silver ore to smelter 1927-1950 containing recoverable lead, copper, and gold. (Wright 53:139, ap. 96, 107)
	Silver King						See; Perseverence. (Wright 53: ap. 83)
	Silver King (Johannesburg Mining and Milling)						See: Silver King No. 2
	Silver King No. 2 (Silver King, Johannesburg Mining and Milling)	Johannesburg Mining and Milling, Maurice Mulcahy, Daggett (1925)	6	30S	41W	MD	Class D. Silver mine in the Randsburg district. Four siliceous veins in Rand schist underlying Tertiary sandstone. Developed by 700-foot vertical shaft with levels at 600, 650, and 700; total drifts about 1000 feet. Produced about 1700 tons of silver ore. Lead and gold also recovered. (Hulin 25:142; Newman 23:61-62; Tucker 23:169; 30:278,284; 31:351, 357; Wright 53: ap. 107)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Silver Lead	Maurice Mulcahy and Virgil Kimball, Daggett (1937)	appr.	10N	1E	SB	Class D, Type 1. Calico district. Small shipment of silver-lead ore in 1937; also cyanided silver ore. Recovery about 12% lead and 10 ounces of silver per ton.
	Silver Lode and Blackwater	John Chambers, Tecopa (1920)	appr.	19N	11E	SB	Class D, Type 1. Ten claims on NE slope of Kingston Range, 17 miles west of Ripley, Nevada, at an elevation of 4600 feet. Galena with lead carbonate in irregular lenses along contact between granite and limestone. Developed by a 350-foot crosscut tunnel, 100-foot shaft located 2000 feet east of the tunnel. High silver-lead assays reported. No known production. (Tucker 21:366)
	Silver Reef						See: Silver Cliff.
	Silver Reef (Akron-Silver Reef)	J. J. McLaughlin 135 South Commwealth Los Angeles (1953)	3,4, 33,34	3N 4N	2E 2E	SB SB	Class D. Total of 17 silver claims on a ridge of limestone breccia projecting above alluvium along the north slope of San Bernardino Range. Lead-silver-gold-copper mineralization reported in matrix only. The silver occurs as cerargyrite. Small production recorded; mainly gold-silver. (Cloudman 19:828-830; Crawford 94:377; 96:328; DeGroot 90:533; Eric 48:317; Storms 93:365-366; Wright 53: 138, ap. 96, 108).
236	Silver Rule (Chambers)	Pacific Lead & Silver Mining Co., Los Angeles (1938)	19 or 31	20N	10E	SB	Class C, Type 1. Five claims in the Kingston Mts., 17 miles east of Tecopa at 4800 feet elevation. Irregular lenses of galena with cerussite along fracture in Noonday

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	LOCATION T.	LOCATION R.	LOCATION B & M	REMARKS
	Silver Rule (continued)	John Prado, 2134 West Valley, Fontana (1943) J. Q. Little, Nipton (1951)					dolomite. Lenses vary from 3 to 15 feet in width. Developed by 4 adits. Shipped to Tooele, Utah, in 1950; smelter recovery was 6% zinc, 8.50% lead, 2.30 ounces of silver per ton, and some gold. Principal activity was between 1910 and 1916 when the ratio of lead to zinc produced was about 20 to 1. Tenor of early shipments not known. Has been described in Inyo County reports. (Eric 48:301, 317; Hazzard 37:298; Norman 51:186; Sampson 37:268; Tucker 21:365-366; 26:500; 30:284; 31:357; 38:455, 479: 43:489, pl. 7; Waring 19:108; Wright 53:113, ap. 84)
	Silver Star (Telescope)	Maurice Mulcahy, Daggett (1926)					Class D. Type 1. Small shipment of ore in 1926 containing 4.75% lead and 8.4 ounces of silver per ton.
237	Silver Tip	W. B. Calhoun, 1112 West 77th Street, Los Angeles (1937) Operators: M. L. Knapp, 156 Magnolia Avenue, San Bernardino (1937)	30	3N	1E	SB	Class D. Type 1. Located in Holcomb Valley. Mine developed by open cut. Ore shipped to smelter in 1937 contained 21.43% lead and 20.50 ounces of silver per ton.
238	Silver Wave		4	5N	17E	SB	Class D. Type 1 (?). Lead-silver mine in the Old Woman Mts. Quartz vein in metamorphic rocks; developed by 4 NW adits which follow the vein. The mill-site on this claim has been relocated as part of the Packard Tungsten property. No known production. (Bailey 02:10; Wright 53: ap. 84)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sinbad	George E. Roth Barstow (1908)					Class D, Type 1. Shipped ore in 1908; smelter recovery 33.26% lead and 24 ounces of silver per ton.
	Smuggler Group	Mrs. J. W. Taylor Westend, California (1941) Operator: Don McPherson Trona (1950)	appr.	26S	44E	MD	Class D. Silver mine located in Slate Range district. Small shipments to Selby in 1941 and 1950; average recovery was 18.95 ounces of silver and about 0.5% combined lead and copper. (Eric 48:317)
	South Western Lead Co.	E. W. Fisher Bagdad, (1913)		7N	10E	SB	Class C, Type 1. Production may have been from War Eagle mine, which see. Milled ore in 1912; smelter recovery from concentrates which represented about 33% of the bulk ore was 15.5% lead, 22.70 ounces of silver, and recoverable copper and gold. Ore shipped in 1913 contained 22.40% lead, 9.10 ounces of silver per ton, and recoverable copper. (Eric 48:317; Wright 53: ap. 84)
	Southern View	C. M. Risbridger, Trona (1942)	appr.	25S	45E	MD	Class D, Type 1. Sulfide deposit in the Slate Range district. Small shipment of ore in 1942 contained approximately 25% lead and 50 ounces of silver per ton.
239	Spar King	A. E. Weidman, Jerry Korfist, Box 75, Baker (1953)	31,32	17½ N	13E	SB	Class D, Type 1 (?). Silver-lead prospect, north Clark Mt. Siliceous zone in massive dolomite. Developed by a 100-foot shaft. No recorded production. (Wright 53:ap. 85)
240	Standard	C. E. Johnson, Cima (1910)	18,19	15N	14E	SB	Class D, Type 2. Ivanpah district, 15 miles north of Cima. Complex sulfides along fault zone in limestone

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Standard (continued)						about 150 feet from quartz monzonite contact. Scheelite found in same zone and in tactite at contact. Now part of Riley Tungsten. Developed earlier by a vertical shaft several hundred feet deep. Recent activity confined to shallow cuts, adits and shafts. Produced about 4000 tons of copper-silver-gold ore containing minor lead, 1906-1910. (Eric 48:305, 317; Jenkins 42:349; Kerr 46:164; Tucker 41:585-586; 43:505-506, pl.7; Wright 53:151, ap. 85, 124)
241	Standard No. 2	Alva Hansen, Cima (1935) R. Bailey Gill, Cima (1953)	19,30 24,25	15N 15N	14E 13E	SB SB	Class D, Type 2. Ten claims in the Ivanpah Mts. Copper-lead-silver mineralization in alteration zone in brecciated Goodsprings dolomite near basic dikes. Developed for about 5000 feet by numerous tunnels and shafts. Shipped copper-silver-gold ore 1917-19, 1934-35. Ore shipped in 1934 also contained lead and showed a smelter recovery of 11.30% lead, 1.36% copper, 10 ounces of silver per ton, and some gold. Copper ore shipped earlier averaged about 12% copper, 10.20 ounces of silver, and 0.24 ounce of gold per ton. (Eric 48:317; Tucker 31:279; Wright 53:68, ap. 19, 85)
	Stemwinder	H. Wicklo, Danby (1911) Stemwinder Mining & Dev. Company, Goffs (1917)		9N	22E	SB	Class D. Silver mine. Shipped ore in 1911 and 1917; smelter recovery was 1.23% lead, 18.80 ounces of silver per ton, and 0.111 ounce of gold per ton. (Eric 48:317)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Stonewall (Stonewall Jackson, Jackson)	M. A. Kiwisar, Jean, Nevada (1942) R. A. Danielson, Jr., C. A. Bickel, 4455 North Bannester, El Monte (1953)	9	17N	13E	SB	Class D. Comprises 15 silver claims in the Clark Mt. district, 12 miles NE of Valley Wells. Silver-lead mine; also gold. Active 1881-96, 1927-28, 1938-42. Replacement bodies in limestone. Main production was in silver; copper, lead, and gold also recovered. Developed by about 1000 feet of adit and drifts. (Cloudman 19: 826; Eric 48:317; Tucker 21:342; 24:94; 30:285; 31:358; Wright 53: ap.78)
	Sulphide Queen	Molybdenum Corporation of America, 3050 East Slauson Avenue, Los Angeles (1953)	12,13	16N	13E	SB	Class D. Gold-silver-lead mine on SE slope of Clark Mts. Vein strikes NW and dips steeply NE at contact of aplite dike and Archean granite-gneiss. Developed by a 365-foot inclined shaft with levels comprising about 2000 feet of drifts and crosscuts. Now included in Mt. Pass rare-earth holdings. (Tucker 40:78-79; 43:461-462, pl. 7; Wright 53: ap. 58, 59)
	Sunnyside Lode						See: Jeff Davis. (Wright 53: ap. 85)
	Sunset	H. R. & J. B. Johnson, Barstow (1948)	appr.	26S	45E	MD	Class D. East slope Slate Range, about 30 miles SE of Trona. Gold mine; developed by 95-foot shaft, 2 inclines, and a 165-foot tunnel. Produced about 230 tons of gold ore from the oxidized zone; also shipped one ton of sulfide ore containing 28.80% lead in addition to gold-silver.
242	Sunshine Copper	Sunshine Copper Company, C. M. McFarlane, Parker, Arizona (1929)	31 36	7N 7N	5E 4E	SB SB	Class D. Type 2. Monumental district, 10 miles south of Pisgah Crater in the Bullion Mts. Production probably from the Tip Top Copper mine. Opened in 1890 as a silver mine; later encountered highgrade copper ore. Minerali-

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sunshine Copper (continued)						zation occurs along a broad shear zone in quartz-porphyry for an exposed length of 150 feet. Developed on 4 levels. Reported to have produced over 70,000 ounces of silver prior to 1900. (N.W. Masters, Pasadena, 1894). Recorded production of copper ore which showed an average recovery of 5% copper and minor lead, 1917, 1922, and 1929. (Aubury 02:251; Crawford 94:69; 96:61; Eric 48:318; Storms 93:354-358; Tucker 30:285; 31:358; Wright 53: ap. 20)
	Sunshine No. 2	J. A. Alexander & Frank Baker, Rt. 1, Barstow (1949)		13N	7E	SB	Class D, Type 2. Soda Lake Mts. Shipped complex ore to Selby in 1949; smelter recovery was 13.10% lead, 2.99% copper, 6.55 ounces of silver per ton, and 0.05 ounce of gold per ton.
	Supply	Lightford & Riggin Twentynine, Palms (1940) I. W. McManaman, Twentynine Palms (1953)	21,22, 27,28	1S	12E	SB	Class D. Gold mine in the Dale district. A 4- to 12-foot quartz vein cutting andesite porphyry strikes N, dips 70-80° E. Developed by a 1250-foot, 70-degree incline, a 200-foot incline, and 675-foot, 85-degree incline with levels at 75-foot intervals. Total underground development about 6000 feet. Produced about 3250 tons of gold ore between 1907 and 1940. Minor lead was was recovered as a by-product. (Cloudman 19:802; Tucker 30:254-255; 31:314-315; 38: 14; 40:12, 63-65; 43:449, 451, pl. 7; Wright 53:81-82, ap. 59)
	Swastika	A. E. Robinson, Barstow (1938)	appr.	14N	1E	SB	Class D. Goldstone district. Silver mine. Small shipments of ore in 1909 and 1938 containing recoverable

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Swastika (continued)						lead and copper. (Eric 48:317; Hulin 25:139)
	Tanzer	C. D. Tanzer, Hallock (1918)					Class D, Type 1. Lead-silver mine. Shipped ore during 1918; average smelter recovery was 4.37% lead, 0.34% copper, 7.31 ounces of silver per ton, and 0.153 ounce of gold per ton. (Eric 48:317)
	Telescope						See: Silver Star
	Thomas W. Hamilton	J. F. Marrs, Leima (1915)					Class D. Shipped gold ore in 1915 also containing 3.13% lead and 1.47 ounces of silver per ton.
	Thunderer	J. R. Shale, Barstow (1926)	10,11 14,15	10N	1E	SB	Class D. Calico district, 5 miles northwest of Yermo. Produced about 15,000 ounces of silver from siliceous ore containing minor lead. Base-metal recovery not reported. Now part of Calico-Odessa, which see.
	Tiptop						See: Silver Dream. (Wright 53: ap. 83)
	Total Wreck						See: Burcham. (Tucker 21:351; 30:285-286; 31:358-359; Wright 53: ap. 85)
	Umberci	Umberci Mines Inc., R. W. Westfall, Mgr. Box 86, Jean, Nevada (1953)					Class D, Type 1. Clark Mt. district. Shipped ore to Selby in 1953 containing 16.75% lead and minor silver.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Uncompagre	T. J. Fitzpatrick, Nipton (1916)					Class B, Type 1. Shipped zinc ore during 1911 and 1916; average recovery was 20% zinc.
	Union	Union Mining Company Robert C. Buck, 851 West Main Street, Barstow (1952)	16	10N	1E	SB	Class D. Comprises 6 gold-silver claims in the Calico district 5 miles NW of Yermo at 2300 feet elevation. A 6-to 30-foot shear zone at contact between rhyolite breccia and lake bed sediments is mineralized with gold and silver in association with cerussite. Developed by a 400-foot adit with a 100-foot winze in 1943. Recent development (1952) consists of 3 shallow shafts, a 2884-foot adit, and 1500 feet of drifts. No production reported. (Erwin 40:303; Tucker 40:246; 43:489, pl. 7; Wright 53:132, ap. 109)
	Vader	T. A. Vader & J. A. Wilson, Cima (1908)					Class D, Type 1 (?). Produced gold 1901-1905. In 1908 silver-lead ore was shipped; smelter recovery was 18.10% lead, 30.50 ounces of silver per ton, and 0.043 ounce of gold per ton.
	Valentine						See: Green Gold
	Vanadium Gold						See: California Comstock. (Wright 53: ap. 130)
	Vanderbilt (Boomerang, Brick Cons., Gold Bar, Webster)	Campbell Estate Beverly Hills Realty, 400 North Beverly Drive, Beverly Hills	2, 3	14N	16E	SB	Class D. Gold mine. Comprises 18 patented claims, 4 miles east of Ivanpah. A series of parallel veins in gneiss, mica schist and quartzite averaging 9 feet, are mineralized with gold in association with chalcopyrite and galena. Developed by a 300-foot shaft, a 440-foot

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Vanderbilt (continued)	Operators: Atascadero Mining Co. Oscar L. Willett, Pres. 824 Garland Blvd., Los Angeles (prior to (1942) J. A. Yeager, Ivanpah (1942)					shaft, and about 4000 feet of drifts, crosscuts, and tunnels. Equipped with a 15-ton cyanide plant in 1938. Produced 1914-1915, 1929-1930, 1934-1942 about 6700 tons of gold-silver ore containing appreciable copper and lead. (Cloudman 19:816; Crawford 94:235; 96:329; Newman 23:9; Storms 93:367; Tucker 30:255; 31:317; 34:325; 43:464; pl. 7; Wright 53:82-83, ap. 60)
	Victor						See: Big Four. (Wright 53:ap. 61, 85)
	Vulture						See: Emperor (Wright 53: ap. 21)
	Wanderer						See: Wonderer (Wright 53: ap. 62)
243	War Eagle	L. W. Osborne, Los Angeles (1943) Stanley Wolfersdorf, Rt. 1 Barstow (1952)	2,3	4N	10E	SB	Class C, Type 1. Comprises 9 claims in Bullion Mts., 9 miles south of Bagdad, at an elevation of 1500 feet. Mineralization occurs along a NW fracture in rhyolite porphyry and consists of galena, cerussite, vanadinite, and cerargyrite. Developed by a 700-foot incline with levels at 100-foot intervals; over 7000 feet of drifts. First worked in 1905. Average recovery on ore shipped has been 6.66% lead, 9.34 ounces of silver per ton, and recoverable copper and gold. In 1952 ore was milled and concentrates representing 10% of the bulk ore were shipped to Midvale; recovery on concentrates was 40.50% lead, 11.10 ounces of silver per ton, 0.095 ounce of gold per ton and minor copper. (Eric 48:319; Tucker 21:366; 24:95-96; 30:286; 31:359; 34:325; 43:489, pl 7; Wright 53: ap. 86)
	Warren	W. W. Warren Daggett (1922)					Class D. Shipped gold-silver ore in 1922; smelter recovery was 33.30% lead in addition of gold-silver.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
244	Wilshire	Mohawk Mines Inc. (1949) Operators: Attana Corp., Nipton (1949) W. F. Fuel, 114 Silver Street, Henderson, Nevada (1952)	29, 30	16N	13E	SB	Class C, Type 1. Clark Mt. district. Developed in 1948 by a 75-foot shaft and 125 feet of drifts. Shipped to Selby 1948-49 ore which averaged 1.67% zinc, 12.10% lead, 0.30% copper, 3.26 ounces of silver per ton, and some gold. Shipped lead-silver ore to Selby in 1952; average recovery was 9.67% lead, 2.57 ounces of silver per ton, and 0.22% copper.
245	Wonder Mountain	Wonder Mt. Mines, L. G. Blakemore, Pres.	15	17N	14E	SB	Class D, Type 1. Comprises 4 claims in the Clark Mt. district near State line, 22 miles from Jean, Nevada. Replacement bodies of argentiferous galena in altered limestone along fractures in contact zone adjacent to quartz-monzonite intrusion. Shallow development only; no known production. (Tucker 43:490, pl. 7; Wright 53:86)
	Wonderer (Wanderer)	Hans Nielson & A. E. Robinson, Rice (1937) M. A. Griffiths and A. C. Le Brun, 4060 Beverly Blvd. Los Angeles, (1953)	8	15N	10E	SB	Class D. Gold mine in the Shadow Mts. 15 miles NE of Baker, near Halloran Springs. Gold-quartz vein 2 to 3 feet wide in quartz-monzonite; strike NE, dips steeply SE. Developed by open cuts and prospect pits for 2000 feet along strike; also a 180-foot shaft. Oxidized ore cyanided 1931 and 1937. Some concentrates were shipped containing 4% lead and about 10 ounces of silver per ton in addition to gold. Some exploration work in 1951. (Tucker 31:320-321; Wright 53: ap. 62)
	Worthley, Consolidated						See: Santa Fe.

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Yankee Girl	E. R. Metzgar, Victorville (1912)					Class **D, Type 1.** Small shipment of lead-silver ore in 1912; recovery 28.50% lead and 9.83 ounces of silver per ton.
	Yim-Wheelock						See: Old Pete. (Wright 53: ap. 50, 51)
	Yucca						See: Yucca Queen
246	Yucca Queen (Yucca)	Yucca Metals Co., J. Rimensberger, Pres. Salt Lake City, Utah (1953) Operator: Walter H. Voyles San Bernardino (1942) Lease to: Alfred & L. B. Hensley and Sidney J. Anderson (1953)	8,17	16N	13E	SB	Class D, Type 2. Comprises 17 claims near Clark Mt. Station, 24 miles north of Cima, at 4500 feet elevation. Argentiferous galena, chalcopyrite, and cerussite occur along a fissure in limestone adjacent to diorite porphyry intrusion. Ore horizon is at contact between white marbleized limestone and blue limestone. Developed by 5 shafts, 20 to 60 feet deep, 2 tunnels, and numerous prospect pits and trenches. Shipped ore in 1926 and in 1942. Last shipment contained 2.60% lead, 3.34% copper, 17.30 ounces of silver per ton, and some gold. Earlier shipment was lead-silver ore and contained 25% lead, 7.90 ounces of silver, and minor copper and gold. (Eric 48:319; Tucker 43:491, pl. 7; Wright 53:113, ap. 86)
	Zenda (Oriental & Red Cloud)	J. R. Lane, Daggett (1923) Zenda Gold Mining Co., Los Angeles (1942)	15,22	10N	1E	SB	Class D. Silver-gold mine located $3\frac{1}{2}$ miles NW of Yermo. Gold and silver associated with galena and chalcopyrite in fractures in rhyolite tuff. Produced silver-gold ore 1918-1923 containing recoverable lead and copper. (Tucker 31: map op. p. 344; 40:247; 43b:491)

SAN BERNARDINO COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Unknown	Hempshire & Farratti, Nipton (1941)					Class D. Ivanpah district. Small shipment of gold ore in 1941; also contained 3.14% lead and 2.66 ounces of silver per ton.
	Unknown	F. C. Perew, Ivanpah (1941)					Class D. Ivanpah district. Shipped gold ore in 1941 containing recoverable lead and silver.
	Unknown	C. B. Reno, Barstow (1942)		8N	1W	SB	Class D. Bellville district. Small shipment of gold ore in 1942; smelter recovery 36.30% lead, 15.50 ounces of silver per ton, and 0.5% copper, in addition to gold. (Eric 48:297)
	Unknown	Hart & Bell, Ivanpah (1941)		15N	14E	SB	Class D, Type 2. Milled zinc ore in 1941. Smelter recovery from concentrates representing about 22% of the bulk ore was 55.80% zinc, 2.50% copper, and 1.14 ounces of silver per ton. (Eric 48:297)
	Unknown	John M. Perry, 1135 McKinley Street, San Bernardino (1953)	16	16N	12E	SB	Class D, Type 1 (?). Comprises 40 acres in the Clark Mt. district. Report on assays made in 1953 was 0.02 ounce gold per ton, 0.50 ounce silver per ton, 3.5% lead, and 0.4% WO_3. New prospect: no known production.
	Unknown	E. J. Tingle, J. D. Harley, 1005 South Maple Street, Inglewood (1950)					Class D, Type 2. Providence district. Shipped to Midvale in 1950; recovery from concentrates was 15.56% lead, 59.20 ounces of silver per ton, and recoverable copper.
	Unknown	Universal Industries Victorville (1943)					Class D, Type 1. Silver Mtn. district. Shipped ore during 1942-1943; average smelter recovery was 6.27% lead, 9.32 ounces of silver per ton, and recoverable copper. (Eric 48:297)

SAN DIEGO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Descanso		24	15S	3E	SB	Class D. Galena and sphalerite in gold-quartz veins near Descanso. (Tucker 25:353; 39: pl.1)
247	Surprise	W. N. Bradbury, Escondido (1914)	NW $\frac{1}{4}$ 1	11S	2W	SB	Class D, Type 1. Two claims, $2\frac{1}{2}$ miles north west of Valley Center. A 3-foot quartz vein striking NW, dipping 60SW in mica schist is mineralized with sphalerite and galena. The workings consist of a 20-foot and a 30-foot shaft; also a 100-foot tunnel. No production record. (Merrill 14:667; Tucker 25:350; 39:29)
	Telluride Claim		appr.	15S	4E	SB	Occurrence of galena and sphalerite in the Deer Park district. (Tucker 25:350)
	Unknown		appr.	14S	1E	SB	Occurrence of galena and sphalerite in the hills of the San Vicente Grant. (Tucker 25:353)
	Unknown		appr.	15S	5E	SB	Occurrence of galena and sphalerite in quartz veins on the west slope of Laguna Mtns. (Tucker 25:350)
	Unknown		appr.	11S	2W	SB	Reported lead occurrence at Valley Center. (Tucker 39:29)

SAN MATEO COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Dennis Martin Ranch						Sphalerite locality reported on Dennis Martin Ranch, 4 miles from Menlo Park. Specimen in State Division of Mines collection. (Hanks 86:135)
	Unknown	South San Francisco Land & Improvement Company, T. V. Barton (1919)					Two parallel veins, one of which was developed by a 75-foot shaft, outcrop on a hill behind South San Francisco High School. Veins strike N 40° W and dip 60° S and are mineralized with argentiferous galena and sphalerite. Maximum width about 6 feet. Veins occur on contact of radiolarian chert and sandstone. (Huguenin 20:173; Lawson 15: map)

SANTA CRUZ COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Pacific Limestone Products Quarry	Pacific Limestone Products Company, Santa Cruz		11S	2W	MD	Limestone quarry with minor sulfides near contact zones. Crystalline calcite and large crystals of clinozoicite; also arsenopyrite and lead-antimony-tin sulfide, either frankeite or cylindrite. (Hubbard 43:44-45)

SHASTA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
248	Afterthought	Afterthought Zinc Mining Company, Ingot (1917-20) Coronado Copper and Zinc Company, 1206 Pacific Mutual Building, Los Angeles (1948-52)	10,11	33N	2W	MD	Class A. Type 2. Comprises 10 patented and 10 unpatented claims. Ore is massive fine-grained sphalerite, galena, and chalcopyrite with other minor sulfides in replacement bodies in porphyritic rhyolite. Gangue minerals are calcite, barite, quartz, and pyrite. Ore bodies are controlled by shear zones at or near contact between Bully Hill rhyolite and sediments of the Pit formation. Rock alteration associated with ore are carbonatization, sericitization, pyritization, and silicification. Outcrops are marked by prominent gossans first prospected for their gold content. Developed by a 420-foot shaft and 1800-foot adit as early as 1917. Total underground development to date is extensive. In 1951 alone, Coronado Copper and Zinc Company drove 1200 feet of drifts and completed 5743 feet of diamond drilling. Mine was equipped with a 100-ton flotation mill which in 1950-51 was operating at near capacity on ore that averaged about 14% zinc, 2% lead, 1.90% copper, 5.5 ounces of silver per ton, and 0.03 ounce of gold per ton. Reserves were exhausted during the first half of the following year and operation ceased in September 1952. Total production from 1917 to 1952 has been about 26,000,000 pounds of combined copper-lead-zinc. (Albers 53; Aubury 05:92; 08:102,105; Averill 39:174,176; Brown 16a:758, 759, 760-761, 806, 809; Crawford 94:377; 96:610; Eric 48:326; Fairbanks 93:32; Laizure 21:516; Logan 24:16; Tucker 22:595; 23:8; 24a:425; 26:143, 211)
	American	Abacada Mining Corp.	12,13	33N	7W	MD	Class D. Six unpatented gold claims, 4 miles from French Gulch. Quartz veins cutting Bragdon slate are mineralized with gold associated with auriferous pyrite and galena. No known production. (Averill 39:130)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Anchar Lode						See: Rising Star. (Eric 48:326)
	Anderson						See: Mammoth. (Eric 48:326)
	Arps	D. V. Saeltzer, Antone Saegel, 2100 West Street, Redding (1938)	20,21 28,29	34N	3W	MD	Class D. Fifteen patented gold claims in the Pittsburgh mining district. Shear zone in Bully Hill rhyolite is mineralized with pyrite, sphalerite, and chalcopyrite in a barite gangue. Adjoins Rising Star. Principal value is in gold. (Aubury 05:96; 08:110; Averill 39:176; Brown 16:761; Eric 48:326; Tucker 23a: 89,90)
	Asher (Jacksonian)	James G. Asher, George S. Burns, Ingot Lease to: C. A. Hill, Charles Walters, Ingot (1926)	appr.	33N	2W	MD	Class D, Type 1 (?). Four unpatented claims about 3 miles north of Ingot near highway. An inclined prospect shaft was sunk 60 feet in a zone mineralized with galena and sphalerite. No known production. Idle. (Logan 26:192; Tucker 39:162)
249	Backbone	Backbone Gold Mining Company, 30 Broad St., New York City, N.Y. (1937)	28,33	34N	5W	MD	Class D, Type 2. Eight patented claims. Massive sulfide body of auriferous pyrite with minor chalcopyrite, sphalerite, and galena. Produced 1898-1899, 1935-1936. Production was mainly in gold; may have operated the Golinsky mine in 1937. (Averill 39:124, 176; Eric 48:327)
250	Balaklala	First National Copper Co., San Francisco (1944)	12,13 14	33N	6W	MD	Class D (?), Type 2. A total of 72 patented claims. Massive, complex sulfide body of pyrite, chalcopyrite, galena, sphalerite, gold, and silver, occur as lenti-

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Balaklala (continued)	M. D. and M. C. Jordan, 504 West Park Street, Butte, Montana (1951)					cular masses in rhyolite. The deposit is expressed at the surface by a large gossan. Worked by adits. Produced 1908-1911, 1913-1919, 1924-1928. The production in 1951 was from flue-dust shipped to Selby and Tacoma. (Aubury 05:84; 08:88-89; Averill 33:7-8; 34a:305; 39:126, 131, 177; Brown 16:758, 761, 771; Crawford 94:245; 96:63; Eric 48:327; Laizure 21:516; Tucker 22:138, 296; 23:8; 24:427; 26:145).
251	Bald Eagle	M. V. Ballou Anderson, Calif. (1939)	10	34N	3W	MD	Class D, Type 2. Deposit similar to Bully Hill. Prospect located 2 miles north of De La Mar in the Pittsburgh mining district. (Aubury 02:9; Brown 16a:762; Averill 39:177; Eric 48:327; Hamilton 14:762)
	Big Dyke	W. H. Dyke, 2006 East 29th Street, Oakland Operators: John Richter, Igo (1918) Igo Mining Company (1948)	17,18 19,20	31N	6W	MD	Class D. Six gold claims. Parallel veins in granodiorite, mineralized with argentiferous galena, tetrahedrite, pyrite, sphalerite, native silver, and gold. Developed by a 153-foot shaft and 200 feet of drifts in 1918. Produced small tonnage of gold ore in 1918 and in 1948 containing recoverable lead, copper, and silver. (Averill 39:171, 176; Laizure 21:526-527; Logan 26:204 205)
252	Bully Hill	Glidden Company 11001 Madison Avenue Cleveland, Ohio	15,16 21	34N	3W	MD	Class A, Type 2. Massive fine-grained sulfide bodies, lenticular in shape, replace Bully Hill, porphyritic rhyolite along shear planes. Ore contains chalcopyrite, sphalerite, galena, and pyrite in a quartz-barite gangue. Mine inactive since about 1914, was developed by a main

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Bully Hill (continued)						haulage adit 300 feet in length; an underground shaft on this level (300-level) was sunk to about the 800-level. Drifts north and south along the shear zone explored the ore zone on 3 intermediate levels. Large recorded production. A smelter was built at Bully Hill and operated until about 1928; a copper matte was produced and zinc was recovered as zinc oxide during the last period of operation. The latest production was in 1950-51 when slag from the Bully Hill smelter was shipped to Tacoma. In 1952 under D.M.E.A., Longyear Company conducted a diamond-drill program for Glidden Company. Results encouraged dewatering and reopening of the old workings, flooded since 1914. This work was in progress in the spring of 1954. (Albers 51; Aubury 05:34, 60;75; 08:78-83, 106; Averill 39:126, 174, 178; Brown 16a:758, 759, 763, 806, 809; Crawford 94:377; 96:61 ; Diller 03:126-130; Eric 48:328; Fairbanks 93:32; Laizure 21:519; Tucker 22:43, 410,411; 26:147, 213)
	Cartwright	E. Cartwright, Round Mt. (1926)	appr.	34N	1W	MD	Class D, Type 1. Lead prospect in Round Mt. district. (Averill 39:178; Logan 26:193)
253	Chance		21	34N	3W	MD	Class D, Type 2. Mine located 1 mile north of Copper City, near Rising Star. Ore similar to Rising Star and Bully Hill. Mined for silver in 1880's. Development minor. (Aubury 02:9; Averill 39:178; Brown 16a:764; Eric 48:328; McGregor 90b:638)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
254	Climax	W. W. Robinson 5923 Ayala Avenue Oakland	16,21	31N	6W	MD	Class D, Type 1. Three claims, 3 miles north of Igo on the south fork of Clear Creek. Quartz veins on contact of granite and slate and in the granite. Ore minerals are pyrite, chalcopyrite, galena, sphalerite, tetrahedrite, native silver, and gold. Reported shipping ore to Selby in 1922 containing 0.08 ounce of gold, 214.9 ounces of silver, 6.6% lead, and 25.2% zinc. Production not determined. (Averill 26:205, 206; Logan 39:179; Brown 16a:782)
	Complex						See: Iron Mountain. (Eric 48:328)
255	Continental	V. V. Apperson et al., Willows, California (1926)	7,18	31N	6W	MD	Class D, Type 1 (?). Seven claims on south fork of Clear Creek, 6 miles NW of Igo. Two quartz veins in gouge zone in altered granodiorite are mineralized with argentiferous galena, pyrite, tetrahedrite, sphalerite, native silver, and some gold. No known production. (Averill 39:179; Logan 26:206)
	Crystal						See: White Star. (Averill 39:179)
	Davidson	L. A. Davidson, Ingot (1913)		33N	2W	MD	Class D. Made a small shipment of highgrade gold-silver ore in 1913. Smelter also recovered 6.8% lead and 11.4% copper. (Eric 48:329)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
256	Donkey	A. J. McKendrick Ingot (1914) Afterthought Zinc Mining Company (1944)	11	33N	2W	MD	Class D, Type 2. Two patented claims 2 miles NE of Ingot. Complex lead-silver-copper ore in rhyolite. Mine located along the same structure as the Afterthought mine; mineralogy differs however. Ore was shipped in 1913; average smelter recovery was 5.20% lead, 3.04% copper, 17.62 ounces of silver per ton, and 0.065 ounce of gold per ton. This property may now be included in Coronado Copper and Zinc Company holdings. (Aubury 05:93; 02:9; 08:105-106; Averill 39:180; Brown 16a:765, 809; Eric 48:330; Lang 99:562; Tucker 24a:432; 26:148)
257	Ganin	Ganin Gold Mines Co. G. S. Ganin, Schilling (1939)	5,8	32N	6W	MD	Class D, Type 2 (?). A group of 14 unpatented claims $2\frac{1}{2}$ miles NW of Schilling. Chalcopyrite, galena, sphalerite, pyrite, and gold occur in a siliceous gangue along a lenticular body of talc. Developed by a 900-foot adit. Only known production has been several shipments of talc. (Averill 33:26; 39:173-174, 181; Eric 48:331)
	Gillispie						See: Mammoth.
258	Gold Belt	Jones & Tucker, Ingot (1914)	4	33N	2W	MD	Class D, Type 2. Six claims, 2 miles west of Ingot. Chalcopyrite, sphalerite with gold and silver occurs in a schistose rock. Prospect developed by a 60-foot shaft. (Averill 39:181; Aubury 08:111; Brown 16a:765; Eric 48:331)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
259	Golinsky	Golinsky Copper Co. c/o W. D. Tillotson Box 68 Redding (1939)	28	34N	5W	MD	Class D (?), Type 2. Flat-lying lenses of massive sulfide ore containing pyrite, chalcopyrite, sphalerite, and minor galena. Developed by 600 feet of tunnels and open cuts in 1937. Recorded production 1907, 1932-33, 1935, and 1937. Ore shipped averaged about 2.15% copper, 5.72 ounces of silver per ton, 0.158 ounce of gold per ton, and recoverable lead. Zinc recovery not reported. (Aubury 08:100; Averill 33:29; 39:124-125, 181; Brown 16a:766; Eric 48:327, 331; Logan 26:149; Tucker 24:432)
260	Greenhorne	Greenhorne Mining Co. 2135 Sacramento Street San Francisco (1944)	5,6 31,32	32N 33N	7W 7W	MD MD	Class D, Type 2. Fifteen patented claims in French Gulch district. Massive pyrite with chalcopyrite, chalcocite, native copper, galena, gold, and silver occurs along shear zones in rhyolite. Developed by 6 adits totaling about 500 feet in 1929. About 180,000 yards were stripped in 1939 and in 1940-41 about 8510 feet of churn drill holes were completed. Large copper-gold-silver production. Minor lead was recovered. Last operation was for gold-silver; about 105,000 tons of gossan was cyanided. (Averill 33:30; 39:126-127, 182; Eric 48:331; Laizure 21:518; Logan 26:149; Tucker 24:433)
261	Highgrade Lead	E. Cartwright, Hamilton Lease to: C. L. Proebstel, Redding (1938)	27	34N	1W	MD	Class D, Type 1. Vein 6 inches to 1 foot wide in limestone is mineralized with argentiferous galena and sphalerite. Developed by a 65-foot shaft. Shipped ore in 1926; smelter recovery was 5.67% lead, 23.50 ounces of silver per ton, and 0.114 ounce of gold per ton. Some development work was done in 1938. (Averill 39:162, 182; Logan 26:193)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Hornet						See: Iron Mt.
	Horstman	A. Horstman, Redding (1938)	9	31N	5W	MD	Class D. Two unpatented gold claims 4 miles SW of Redding. Quartz vein one foot wide in Copley meta-andesite is mineralized with gold in association with galena and pyrite. Developed by a series of shallow prospect pits for 100 feet along strike (N 50° W). No known production. (Averill 39:140,182)
262	Iron Mountain (Hornet-Richmond)	Mountain Copper Co., Ltd., 216 Pine Street, San Francisco	34,35	33N	6W	MD	Class A, Type 2. Irregular masses of fine-grained massive sulfide ore containing pyrite, chalcopyrite, sphalerite, galena, gold, and silver, in Balaklala rhyolite along shear zone. Developed by an adit over 3000 feet long, several shafts, and about 10,540 feet of diamond-drilling (1942-47). Operated continuously since 1895. Early production was mainly copper-gold-silver. Since 1942 equal amounts of copper and zinc have been recovered. Lead production is small (about 150,000 pounds total). The silver to gold ratio has been about 12 to 1. Since 1951, only cement copper, and pyrite have been produced. (Aubury 08:70-78; Averill 34a:305; 39:185; Crawford 94:377; Eric 48:332; Fairbanks 93:46; Irelan 88:566; Kett 47:105-172; Kinkel 51a; Tucker 24a:423; 26:142, 154-160)
263	Jones, Leslie	Leslie Jones, Thelma L. Jones, Vivian A. Jones, Igo	5,6	30N	6W	MD	Class D, Type 1. Prospect located between Igo and Ono. Surface prospecting only. Outcrop mineralized with galena and sphalerite containing gold and silver. (Averill 38:162, 183)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
264	Mammoth (Anderson, Mayflower, Sheridan, and Gillispie)	U. S. Smelting Refining and Mining Company, Salt Lake City, Utah	1,12 32,33	33N 34N	6W 5W	MD MD	Class A. Type 2. Long flat-lying lenses of massive sulfides in shear zone in Balaklala rhyolite. Ore consists of a fine-grained aggregate of pyrite, chalcopyrite, sphalerite, and minor amounts of galena, tetrahedrite, and other sulfides. Large recorded production of copper-zinc-silver-gold ore 1889-1925. The ratio of copper to zinc, recovered, was about 10 to 1. In 1948 a large tonnage of smelter slag was shipped; average recovery was about 17.3% zinc and 12.42% lead. (Aubury 05:87; 08:95-97; Averill 39:184; Brown 16a:758, 767; Crawford 94:252; 96:361; Eric 48: 334; Hodson 93:397; Irelan 88:568; Kinkel 52; Tucker 22:206,296; 24a: 434-435; 26:150)
	Mammoth Smelter (Kennett Smelter)	International Smelting and Refining, Salt Lake City, Utah (1951)	33	33N	5W	MD	Shipped a large tonnage of flue dust in 1951-1952. Average recovery at Tooele was 15.10% zinc, 7.96% lead, 1.21% copper, 4.51 ounces of silver, and 0.039 ounce of gold.
265	Morris		10	34N	3W	MD	Class D. Type 2. Comprises 120 acres, 2 miles north of Bully Hill; ore similar. Developed by a 400-foot adit and 80-foot adit. No known production. (Averill 39: 185; Brown 16a:769; Eric 48:335)
	Mountain Copper						See: Iron Mt.
	Niagara	Niagara Summit Mining Company, French Gulch (1936) E. M. Clark, 1332 Willits Street, Redding (1950)	6,7 8,17 18	33N	7W	MD	Class D. Gold mine. Large recorded gold production 1889-1942. Minor lead recovered in concentrates shipped Most of the ore was cyanided. Last operated in 1950 when old tailings were cyanided. (Averill 33:40-41; 39:146,186; Brown 16a:769; Crawford 94:253; 96:363; Eric 48:335; Fairbanks 93:50; Logan 24:15; McGregor 90:636-637; Tucker 22:43, 296)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Number 8						See: Iron Mt.
	Old Glory	B. F. Bibbens, H.C. Woodrum, Redding (1926)	appr.	34N	1W	MD	Class D. Type 1. Prospect located $5\frac{1}{2}$ miles NE of Ingot. Veins in limestone mineralized with galena and sphalerite. Shallow prospecting only. (Averill 39: 186; Logan 26:215-216)
	Old Mine						See: Iron Mt.
	Philadelphia and Roosevelt	Vogt & Vogt, French Gulch (1935) A. P. Robillard, French Gulch (1941)	17	33N	7W	MD	Class D. Gold associated with argentiferous galena and minor chalcopyrite. Developed by a 350-foot adit and 600 feet of drifts. Produced 1929-41 over 5000 tons of gold ore, most of which was milled and gold recovered directly. Some ore or concentrates was shipped and minor lead and copper were also recovered. (Averill 33:43-44; 39:186; Eric 48: 336)
266	Pit River	E. Popejoy (1914)	25	34N	3W	MD	Class D. Type 2. Ore reported similar to Bully Hill. Prospect located about $3\frac{1}{2}$ miles NE of Copper City. Developed by short adits. (Aubury 02a: 9; Averill 39: 186; Brown 16a: 770-771; Eric 48:336)
	Popejoy						See: Pit River.

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
267	Rising Star (Anchor Lode)	California Zinc Company, Oakland (1944) Glidden Paint Company, 11001 Madison Avenue, Cleveland, Ohio (1953)	21,28	34N	3W	MD	Class A. Type 2. Massive complex sulfides in Bully Hill porphyritic rhyolite along shear zones. Same as Bully Hill. Mine developed by an 850-foot shaft, 430-foot adit and 6000 feet of drifts. Produced 1924 and 1927. Some ore was smelted at Bully Hill smelter; some milled. Average recovery was about 13.50% zinc, 1.5% copper, 2.81 ounces of silver, and minor gold and lead. See also Bully Hill.
	Salinger	Herbert Salinger, San Francisco (1921)	appr.	33N	7W	MD	Class D. Type 1 (?). French Gulch district. Shipped lead-silver ore to smelter in 1921; recovery 15.40% lead, 14.90 ounces of silver per ton, 0.745% copper, and 0.064 ounce of gold per ton. (Eric 48:337)
	Sanders						See: Arps.
268	Shasta King	Gray Eagle Copper Company, Redding, W. J. Walker and R. T. Walker, Leadville, Colorado (1951) Former Operators: Trinity Copper Corp., (1902-1909) U. S. Smelting Refining and Mining (1918-1919)	11,12	33N	6W	MD	Class D (?). Type 2. Massive pyrite with chalcopyrite and minor sphalerite, galena, tetrahedrite, gold, and silver occurs in a saucer-shaped body, essentially horizontal, in porphyritic Balaklala rhyolite. Mine developed by adits. Produced 1902-1909, 1918-1919 a total of 83,889 tons of ore averaging about 0.034 ounce of gold, 1.01 ounces of silver, and 2.92% copper. Lead-zinc not recorded, however, the copper to zinc ratio is 1 to 3. The ore was 85 to 90% sulfides. Deposit first located by large gossan. (Aubury 08:87-88; Averill 39:187; Diller 06; Eric 48:337; Graton 10:71-111; Kinkel 51; Tucker 24a:445-446)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Shasta Zinc & Copper						See: Bully Hill.
	Sheridan						See: Mammoth.
	Silver Falls-Chicago Consol.	L. Elisabeth Bass Redding (1926) Operator: B. C. Wright, Igo (1935)	17,18 19,20	31N	6W	MD	Class D. Eight patented silver claims, 4 miles NW of Igo. Quartz veins in quartz-diorite, mineralized with argentiferous tetrahedrite, small amounts of galena, sphalerite, chalcopyrite, and gold. A large silver production reported in 1926. Mine developed by a 210-foot shaft. (Averill 39:171-172, 188; Brown 16a:798; Laizure 21: 527-528; Logan 26:207-210)
	Silver Fern	F. L. Ricker, Redding (1948)	appr.	34N	1E	MD	Class D, Type 1. Cow Creek district. Shipped ore in 1948 containing 24.70% zinc, 6.20% lead, 13.53 ounces of silver per ton, and recoverable copper.
269	St. John	Mrs. C. E. Eilers, Ingot (1925) Lease to: E. Cartwright, Ingot	30	34N	1W	MD	Class D, Type 1 (?). Irregular masses and stringers of galena, sphalerite, and chalcopyrite in limestone. Small production reported prior to 1926. No record of production. (Eric 48:337; Logan 26:216)
270	Sugarloaf & Homestake	C. A. Hill, Ingot and Charles Walters, Montgomery Creek (1939)	4	33N	2W	MD	Class D, Type 2. Five claims at 1500 to 2000 feet elevation. Mine reached from Alturas Highway by about $5\frac{1}{2}$ miles of steep road. Siliceous vein several feet wide at contact between slate and rhyolite; mineralized with pyrite, chalcopyrite, galena, and sphalerite. Developed by several long adits and shallow shafts totalling about 1200 feet of underground workings. No known production. (Averill 39:162-163)

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sybil	Lionel von Kruze French Gulch (1940) Former Operators: Harry Thompson, San Francisco (1922) Shasta Hills Mining Company, San Francisco (1926)	7	33N	7W	MD	Class D. Consists of 2 gold claims and mill site, 5 miles NW of French Gulch. Blue-gray quartz and calcite veinlets near contact of slate and granite-diorite dike complex are mineralized with gold associated with galena, sphalerite, pyrite, and arsenopyrite. Developed by 3000 feet of underground workings including a 150-foot shaft and several adits. Produced about 2000 ounces of gold and minor lead and silver. Average millheads reported $40.00 per ton. (Averill 33:50-51; 39:153, 189; Brown 16a:777; Logan 26:178-179; Tucker 22:43, 138, 296, 408; 23:11)
	Washington	George Grotefend Redding (1938) J. H. Scott Co. Merchants Exchange Bldg., San Francisco (1942)	16	33N	7W	MD	Class D. Gold mine. Quartz veins in Bragdon slate and Copley meta-andesite adjacent to granite and diorite porphyry dikes of the French Gulch district. Gold associated with pyrite, galena, sphalerite, and arsenopyrite. Developed by a 565-foot adit and over 1000 feet of drifts. Large recorded gold production, minor copper, lead and silver also recovered. (Averill 33:57; 39:156-157, 190; Brown 16a:774, 804; Crawford 94:260; 96:368; Eric 48:339; Fairbanks 93:50; Logan 26:179-180; McGregor 90:635-636; Tucker 22:43; 23:11)
	White Star (Crystal)	Igo Mining Company Box 1412 Redding (1951)	20	31N	6W	MD	Class D. Silver-gold mine. Eight claims, 3 miles NW of Igo on Andrews Creek. Two parallel quartz veins 1 to 5 feet wide in granodiorite, about 160 feet apart, dip steeply SE. Ore minerals are native silver, tetrahedrite, sphalerite, galena, chalcopyrite, pyrite, and gold. Developed by a 200-foot adit with several hundred feet of drifts. Produced 1891-1898, 1918-1919, and in 1930, mainly silver and gold which was recovered direct-

SHASTA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
							ly. Some ore was reported shipped to Selby in 1922, containing 1.8% lead and 13.3% zinc in addition to 150 ounces of silver and 0.2 ounce of gold per ton. (Averill 39:172-173, 190; Brown 16a:784; Logan 26:210)
271	Woodrow Wilson		4	33N	2W	MD	Class D, Type 2. Two vein systems just west of Afterthought mine. One vein system is similar to Afterthought, the other is high in lead. Ore minerals are chalcopyrite, sphalerite, galena, and pyrite. No known production. (Averill 39:190; Eric 48:340; Tucker 23a:56; 24a:447; 26:162)
	Yankee John (Yankee Jack)	Maude Hill, Redding (1950) Operators: Igo Mining Company Redding (1952)	17	31N	5W	MD	Class D. Three unpatented gold claims about 6 miles west of Redding. Parallel quartz veins 2 to 10 feet wide in Copley meta-andesite near slate contact, are mineralized with free gold associated with galena, chalcopyrite, sphalerite, and pyrite. Developed on 3 levels from a 300-foot vertical shaft. Moderate gold production recorded 1907 to 1952. Minor copper, lead, and silver also recovered. (Averill 33:57-58; 39:190; Eric 48:340; Laizure 21:524; Tucker 22:495; 23:11)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Alaska						See: Sierra Alaska.
	Empire-Lone Star (Gold Valley)	Andrew Bachels, 80 Pierce Street, San Francisco (1951)	25,26	21N	11E	MD	Class D. Gold mine located about 4 miles west of Gold Lake. Comprises 5 lots, patented. Produced intermittently from 1905 to 1950. The principal production was in 1905. The ratio of gold to silver recovered was 1 to 4. Minor copper and lead was also recovered. (Averill 42:54; Crawford 94:265; 96:376-377; Eric 48:324; Logan 29:163; MacBoyle 20:86)
	Gold Point (Gray Eagle)	Amelia Sullivan, Downieville (1948) Operators: G. A. Adams, Downieville (1909-10) Yellow Tiger Mining Company (1928) Gold Point Mining Co. (1933) Tombstone Development Company (1939) Best Mines Company, Downieville (1948)	28	20N	11E	MD	Class D. Gold mine 6½ miles east of Downieville on Highway 49. Comprises 11 claims and 3 millsites. Developed by a 600-foot tunnel, 1000 feet of drifts, and about 1000 feet of diamond-drilling. Drilling was by Best Mines Company in 1948. Produced 1909-10, 1938-1948, intermittently. Total production about 14,000 tons of gold ore. During the last period of operation concentrates were produced which constituted about 2.7% of the bulk ore and contained 7.12% lead, 1.34% zinc, and 0.54% copper in addition to gold-silver. The gold to silver ratio was about 4 to 3. (Averill 42:27-28, 56; Eric 48:324; Logan 29:165-166; MacBoyle 20:91)
	Gold Valley						See: Empire-Lone Star.

SIERRA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Gray Eagle						See: Gold Point.
	Original Sixteen to One (Sixteen to One)	Original Sixteen to One Mine, Inc., 1611 Russ Building, San Francisco	3,4 34	18N 19N	10E 10E	MD MD	Class D. Large gold mine in the Alleghany district. Mainly free gold associated with minor sulfides, galena, sphalerite, arsenopyrite, pyrite, and chalcopyrite. Ore shoots occur in quartz veins in Tightner and Kanaka formations. Underground workings extensive. Operated since 1910. In recent years annual production has been over 10,000 tons of gold ore. Most of the gold is recovered directly. Some lead and copper have been recovered from concentrates shipped to smelter. The gold to silver ratio in ore recently mined has been about 6 to 1. (Averill 42:44-45, 62; Eric 48:325; Ferguson 15; 32; Hamilton 22:39; Logan 21:475; 23:73, 143, 514-517; 24:17-18; 29:171-172; MacBoyle 20:122-124)
	Scotia	E. L. Crafts, Grass Valley (1934)	4	18N	10E	MD	Class D. Gold mine in the Alleghany district. Operated 1931 and 1934; produced about 2904 tons of gold ore which was reduced to 59 tons of concentrates containing recoverable lead and copper in addition to gold-silver. The ratio of recoverable gold to silver was about 8 to 3. (Averill 42:64; Crawford 94:272; Eric 48:325)
	Sierra Alaska (Alaska)	Sierra Alaska Mining Company, Pike (1942)	5,8	18N	9E	MD	Class D. Gold mine. Comprises 400 acres, patented. A 3-foot quartz vein in slate near diorite contact is mineralized with gold in association with galena, chalcopyrite and pyrite in a quartz-talc gangue. The mine is developed on 7 levels from a 720-foot vertical shaft; total drifting about 2,000 feet. The largest stopes are about 18 feet in width. Produced intermittently since 1893, about 90,000 tons of gold ore. During this period about 48,000 pounds of lead and 8,000 pounds of

SIERRA COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Sierra Alaska (continued)	H. L. Sorenson, 685 Sixth Street, San Francisco (1951)					copper have been produced as a by-product. The gold to silver ratio has been about 6 to 5. (Averill 42:17-18, 50; Crawford 94:261; 96:371; Eric 48:324; Irelan 87:58-59; Logan 35:3; MacBoyle 20:118-119)
	Sixteen to One						See: Original Sixteen to One.
	Telegraph	H. S. Tibbey, Downieville	4	20N	10E	MD	Class D. Gold mine at headwaters of Goodyear Creek on Fir Cap Mountain about 9 miles NW of Downieville. During a drifting operation in slate bedrock to explore a higher rim of an auriferous, lava-capped channel, a 35-foot quartz vein was discovered. It contained gold associated with galena, sphalerite and pyrite. No known production. (Averill 42:66; Logan 29:187; 35:3; MacBoyle 20:126; Preston 92:410-412)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Balfrey						See: Siskiyou Lead mine. (O'Brien 47:455)
	Blue Bell						See: Copper Creek. (O'Brien 47:424)
272	Blue Ledge	George Everett, Box 149, Tacoma, Washington (1930) Compania Metalurgica Mexicana, 120 Broadway, New York City, N.Y. (1944)	3 34	47N 48N	11W 11W	MD MD	Class C, Type 2. Comprises 26 claims, 33 miles SW of Jacksonville, Oregon. Chalcopyrite and sphalerite with minor galena, gold, and silver in lenses in sericite schist. The ore zone is about 5 feet wide, strikes north and dips 60W, and has been developed for 1500 feet along strike. Worked by a vertical shaft. Produced 1917-1920 and 1929-1930; average smelter recovery was 2.70% zinc, 14% copper, 5.8 ounces of silver per ton, and 0.09 ounce of gold per ton. Minor lead was also recovered. (Aubury 05:108; 08:128; Averill 35:271; Brown 16b:817; **Eric** 48:341; Hundhausen 47:1-16; Laizure 21:530; Logan 26a:375; Maxson 33:145; Neale 27:502; O'Brien 47:424; Shenon 33:12-13; Stoval 08:635-636; Tucker 23:8; Weed, 16:228; 18:633)
	Chalcopyrite						See: Polar Bear.
	Columbia Group (K. C. Columbia)	K. C. Columbia Mines, Inc., Walter A. Scofield, Box 502, Garibaldi, Oregon (1950)	4,5,6, 32	45N 45N	10W 9W	MD MD	Class D. Gold mine. An 8-to 48-inch quartz vein striking NE, dipping 18 to 30° NW in black slate is mineralized with gold associated with minor galena and sphalerite. Developed by 5 adits, 80 to 400 feet long. Produced 1895 to 1912 over 7,000 tons of gold ore. Silver recovery was small. Operated 1950-51 during which time minor lead and zinc were recovered also. (Averill 31:35; 35:321; O'Brien 47:439-440)

SISKIYOU COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
273	Copper Creek (Blue Bell)	I. D. Turner, Redding (1947)	31	16N	8E	H	Class D. Type 2. A prospect comprising 6 claims reached by trail $1\frac{1}{2}$ miles SE of Elk Creek. An 8-foot shear zone in andesite is replaced along 3 zones, 2 to 12 inches wide, by chalcopyrite and sphalerite with some malachite. Ore zones strike N 15° W and dip 20° W. Developed by a 12-foot prospect shaft. (O'Brien 47:424)
	Dakin						See: Gray Eagle.
	Eliza	DeWitt & Lawson Estate, Yreka Operators: Gold Crown Mining Company, Yreka (1939)	4,5 8,9	45N	8W	MD	Class D. Comprises 5 gold claims. Gold occurs associated with galena in a NE-striking quartz vein 1 to 10 feet wide in an lamprophyre dike; dip is 78° W. Mine developed by 5 tunnels, the longest is 1700 feet. Produced about 710 tons of gold ore containing recoverable lead and silver. Operated 1902-03, 1909, and 1938-39. (Averill 31:32-34; 35:280 318; Brown 16:831; Logan 25:439; Tucker 22:297; 22a:600; 23:11; 23a:138)
	Fippen & Hayden Placer	M. E. Gardner, Callahan (1924)	appr.	40N	7W	MD	Class D. Type 1. (?). Originally a placer claim. Veins and stringers mineralized with argentiferous galena associated with barite, in pods up to one foot wide, were exposed by ground sluicing. Galena float also noted in the area around Gazelle. (Averill 35:330)
	Gold Crown	W. A. Johnson, Yreka Operators: Gold Crwon Mining Co.	11	45N	8W	MD	Class D. Gold mine located on Humbug Creek, 12 miles west of Yreka. Developed by a 25-foot vertical shaft, 70-foot inclined shaft, 1200-foot tunnel, and several hundred feet of drifts. Equipped with a 20-ton amalgamation mill. Produced 1932-1941 about 224 tons of

SISKIYOU COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Gold Crown (continued)	Lester B. Jacobson, Yreka (1941)					gold ore; 12 tons of concentrates shipped contained about 6.25% lead and recoverable copper in addition to gold-silver. The gold to silver ratio was about 2 to 1. (Eric 48:343)
274	Gray Eagle (Dakin)	Mason Valley Mining Company, Nevada (1922) Gray Eagle Copper Co. R. J. Hendricks, Mgr., Happy Camp, California (1945)	4	17N	7E	H	Class D (?), Type 2. Comprises 32 claims. A flat-lying, disseminated sulfide body 800 feet long, 400 feet wide, and up to 70 feet thick. This ore body, which was roughly almond-shaped, was mined by room and pillar methods. It is reported that about 5% of the ore was left in pillars. The ore consisted of chalcopyrite and pyrite with minor sphalerite replacing schist. Production reported to be 465,000 tons of 3% copper ore. (Aubury 08:132; Averill 35:272; Brown 16b:818; Eric 48:343; Laizure 21:531; Logan 25a:428; Maxson 33:145; Mining World 43:5-9; Neal 27:485; O'Brien 43:83; 47:425-427; Tucker 23:8; Weed 14:409; 18:633; 20:1066; 22:1250)
	Green Dragon	Floyd Munson Operator: Frank H. Cory, Box 296 Callahan (1953)					Class D, Type 1. Small shipment of ore in 1953; smelter recovery about 56.90% lead and 6 ounces of silver per ton.
	K. C. Columbia						See: Columbia
275	Polar Bear (Chalcopyrite)	Albert F. Stone, Callahan (1917)	12	40N	8W	MD	Class D, Type 2. Chalcopyrite, chalcocite, sphalerite, and pyrite in serpentine. Developed by a 210-foot shaft and a 120-foot, N85W, adit. Complex ore was shipped to

SISKIYOU COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Polar Bear (continued)	Byron Burch, Seattle, Washington (1943) Operators: Winters and Heath (1943)					smelter in 1917; recovery was 3.06% zinc and 13.93% copper. Also a reported production of 200 tons of 17% copper ore in 1900. (Aubury 05:106; Brown 16:819; Eric 48:345; O'Brien 43a:329; 47:427)
276	Siskiyou Lead (Balfrey)	M. H. Balfrey, Gazelle Lease to: Evans and Mitchell, Gazelle	29, 28	41N	7W	MD	Class D. Type 1 (?). Comprises 800 acres, patented. Galena, sphalerite and minor chalcopyrite occur as a fine-grained replacement along shear zones in andesite. Gangue minerals include barite and calcite. Maximum width of zone is about 12 feet. Assays are reported showing 8% lead, 2% zinc and some gold. The property was prospected by a 100-foot adit which cut the ore zone 70 feet from the portal, developing 35 feet of backs; also by two shafts, 50 and 80 feet deep, and numerous prospect pits. All workings are caved. No known production. Idle since 1929. (Averill 35:274, 314, 330; O'Brien 47:455)
	Spencer	E. C. Wyatt & G. A. Milne, Box 536, Fort Jones (1952)	appr.	43N	9W	MD	Class D. Gold mine in Scott River district. Small shipment of highgrade gold ore in 1952 containing 12% lead.

TRINITY COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Brown Bear	E. E. Erich, French Gulch (1941)	11,12 13,14 16,24	33N	8W	MD	Class D. Gold mine. Holdings include 35 separate parcels of patented land. Auriferous quartz veins in Bragdon slate intruded by dikes, are mineralized with free gold associated with galena, sphalerite, and pyrite. Sulfides constitute about 3% of the ore. Large gold production reported. (Averill 33:13-15; 41:27-28; Brown 16:885-886; Crawford 94:308; 96:440-441; Dunn 93:483-484; Erich 14: 333-334; Ferguson 14:70-71; Irelan 88:639; Logan 26:15, 16, 28; Miller 90:713)
	Enterprise (Yellowstone)	Chicksan Oil Company Fullerton, California (1941) Rex C. McGee, Helena (1946)	29,32	35N	11W	MD	Class D. Gold mine. Group of 18 lode claims, 3 of which are patented (Yellowstone Group). A 2-foot quartz vein dipping 10 degrees in greenstone intruded by diorite dikes is mineralized with free gold associated with galena, sphalerite, and pyrite in quartz and carbonate gangue. Developed by several thousand feet of underground workings including a shaft and tunnels. Large recorded gold production since 1889. Last operated 1935-1936 when some lead and copper were recovered in concentrates shipped to smelter. (Averill 41:33-34, 77; Brown 16c:887-888; Crawford 96: 446, 454; Dunn 93:482; Hamilton 22:18; Irelan 88: 643; Logan 26:18-19; Miller 90:710; Tucker 22b:207)
	Geneva	Roy Rohlin, Big Flat (1939)	19,20	38N	9W	MD	Class D. Gold mine; developed by 350-foot adit. Produced 1931-1939 about 250 tons of gold ore. Gold was recovered directly. Some concentrates were shipped in 1935 containing 6.16% lead. The ratio of recoverable gold to silver was about 1 to 3.

TRINITY COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Grizzly	J. E. Ladd, Helena (1913)					Class D. Small production of gold ore containing recoverable lead in 1909, 1910, and 1913.
277	Island Mountain	E. R. Leach, 214 Hillside Avenue, Piedmont, California (1953)	9,10, 15	5S	6E	H	Class D, Type 2. Located on Eel River, about ½ mile from NW Pacific R.R. Massive sulfide deposit in sheared shale and graywake of Franciscan age. Ore minerals include pyrrhotite, chalcopyrite, gold, and silver with minor amounts of sphalerite, galena, and cobaltite. Total production 1915-1930, 131,598 tons of massive sulfide ore which was shipped directly to smelter at Tacoma. The average smelter recovery was 0.0651 ounce of gold per ton, 1.092 ounces of silver per ton, and 3.296% copper. Lead-zinc were not recorded. The galena and sphalerite occur mainly in the partially replaced zones peripheral to the massive ore. Ore shipped came from huge boulders of massive ore in landslide debris, which do not appear to be in place. (Aubury 02:124-126; 08:148-150; Brown 16c:881; Miller 90:716; Stinson 52)
	Liberty						See: Poeth.
	Paymaster	P. X. Johnson Estate, Redding Operator: Charles M. Chrisman, Lewiston (1942)	2	33N	8W	MD	Class D. Gold mine. An 18-inch gouge zone striking N 65E, dipping vertically in Copley meta-andesite adjacent to 25-foot diorite dike, is mineralized with gold associated with galena, chalcopyrite, and pyrite. Developed by a 500-foot tunnel. Produced 1930-1942, about 1400 tons of gold ore. Minor lead and copper were recovered also. Gold to silver ratio was about 4 to 1. (Averill 33:43; 41:53-54, 85; Eric 48:351)

TRINITY COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Poeth (Liberty)	L. B. Williams, Carrville (1941) Operators: Liberty Mines Company	4	37N	8W	MD	Class D. Six gold claims on Boulder Creek at mouth of Coffee Creek. A 20-inch quartz vein in granodiorite cut by lamprophyre dikes, is mineralized with free gold and tellurides associated with galena, chalcopyrite and pyrite. Developed by a 145-foot shaft, 40 feet of drifts, and 180 feet of diamond-drilling (1941). Produced about 330 tons of gold ore 1940-41 containing recoverable lead, silver, and copper. The gold to silver ratio is about 2 to 3. (Averill 41:82; Eric 48:351; Logan 26:22, 23-24; Mac Donald 13:35)
	Yellowstone						See: Enterprise.
	Unknown	C. B. Demerest Trinity Center (1933)	appr	36N	8W	MD	Class D. Small gold-silver production in 1933 from ore containing 3.1% lead. The gold to silver ratio was about 1 to 10.

TULARE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
278	Arsenic & Soda Springs	Harry Ford, Virgil Pritchard and Leslie Meembleau, Camp Wishon (1930)	8(?)	20S	31E	MD	Class D. Type 2. Zinc-lead-copper prospect near Adler Creek trail about 3 miles NE of Camp Wishon. (Franke 30:471)
	Black Jack						See: King Soloman. (Franke 30:471)
279	Cedar Hill	R. H. Frantzich, R.V. Powell, Camp Wishon (1943) R. H. Frantzich, 800 G Street, Fresno (1952) Operators: Charles T. Williams, Springville (1943) Ben Bell, 124 Oakdale Drive, Bakersfield (1952)	29	19S	31E	MD	Class D. Type 1. Camp Wishon district. Silver-lead prospect. Argentiferous galena and sphalerite replace thin limestone beds intercalated with chlorite-sericite schists and black slate. Developed by a 10-foot shaft and a 50-foot adit (1943). Small shipment of ore was made in 1943; smelter recovery was 51.4% lead, 81 ounces of silver per ton, and recoverable copper. All prospects in the Camp Wishon district are inaccessible; all shipments made have been packed out by burro. (Eric 48:352; Franke 30:437, 467)
280	Chihuahua	Arthur Crowley, Mineral King (1916)	13	17S	31E	MD	Class D. Type 1. Prospect located on ridge between Lake and Rock Gorge Canyons, 2 miles east of Mineral King at an elevation of 10,500 feet. A vein 12 inches wide, trending NW and dipping 75° S occurs on limestone-slate contact. Prospected by a 150-foot crosscutting adit. Ore minerals are galena and pyrite in a quartz gangue. Idle in 1916. (Franke 30:47; Tucker 19d: 949)

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
281	Comanche	C. T. Williams, Box 4, Porterville (1930)	22	17S	31E	MD	Class D. Type 1. Mineral King district. Lead-zinc-silver prospect at 9600 feet elevation. Argentiferous galena and sphalerite occur in an epidote gangue. Reported assays show about 0.02 ounce of gold, 4.70 ounces of silver, 23% lead, 25% zinc, and 0.25% cadmium. (Later incorporated with Sequoia, which see.) (Franke 30: 469; Tucker 19d: 949)
	Crystal Prospect	T. J. Crabtree, Porterville (1916)	appr.	17S	31E	MD	Class D. Type 1. Located in Lake Canyon, 2 miles NE of Mineral King at an elevation of 10,000 feet. Galena and sphalerite occur in a 6-inch to 12-inch vein on contact between slate and limestone. Vein strikes N, dips 75W and is prospected by a 20-foot shaft. (Franke 30:471; Tucker 19d:940)
	Dolly Varden	C. T. Williams, Box 4, Porterville (1930)	appr.	17S	31E	MD	Class D. Type 1 (?). Mineral King district. Prospect located on a ridge between Eagle Lake Canyon and Mosquito Lake Canyon, at an elevation of 10,000 feet. An 8 to 12-inch quartz vein striking N 60° E, dipping 65° N in fracture in granite is mineralized with argentiferous galena and sphalerite. Developed by a 25-foot incline. Idle in 1916. Later incorporated with Sequoia, which see. (Franke 30:469; Tucker 19d:949-950)
282	Elder Berry	Bell Elster, Camp Wishon (1930)	15	20S	31E	MD	Class D. Type 1. Lead-zinc claim in the Camp Wishon district. (Franke 30:467)

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
283	Elster Claim	Bill Elster, Camp Wishon (1930)	4 (?)	20S	31E	MD	Class D, Type 1. Camp Wishon district. Reached by trail from Camp Wishon, about 2 miles up the north fork of Alder Creek at an elevation of about 6500 feet. Numerous open cuts expose small discontinous veinlets of sphalerite and galena which swell and pinch in contorted beds of siliceous slate and chlorite schist. Limy beds appear to have been replaced selectively. Gangue minerals are quartz, calcite, epidote, brown garnet, and diopside. No igneous rocks outcrop on the claims. An adit driven east about 100 feet vertically below the outcrop is now caved but attempts were being made to reopen it (1953). Material on the dump indicates that the mineralized zone was cut on this level. (Franke 30:467)
	Empire	W. O. Clough Mineral King (1916)	appr.	17S	31E	MD	Class D, Type 1. One mile NE Mineral King on south slope of Empire Mountain at 10,400 feet elevation. Two claims and millsite. Sphalerite with some galena and arsenopyrite in a calcite gangue, occurs in silicified limestone at contact with slate and granite. No well-defined veins reported. Discovered in 1875, worked until 1880 for gold-silver. Developed by a 600-foot adit at 10,000 feet elevation. About 400 feet north of this adit, at 10,400 feet, a 500-foot adit, N 25° E, intersects a shaft at a depth of 125 feet, about 400 feet from portal. About 50 above this tunnel is a third adit 50 feet long. From this tunnel a shaft was sunk 125 feet intersecting a cave containing a lead-silver carbonate ore body with a N strike and 70W dip. The enclosing limestone (calcite) is 50 feet wide and dips 50° SW. An epidote "dike" separates the crystalline limestone from the slate hanging wall. To the north of these workings, along an epidote "dike" striking N in limestone, a 10-foot shaft sunk on an iron-

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Empire (continued)						stained outcrop disclosed 6 feet of sphalerite. Idle in 1917. (Goodyear 88:645; Tucker 19d:950)
	Empire North Extension	Arthur Crowley, Mineral King (1916)	appr.	17S	31E	MD	Class D. Type 1 (?). NW of Empire mine. One patented claim and millsite. Developed by a short crosscut tunnel and a number of shallow shafts. No ore developed. Idle in 1916. (Tucker 19d:950)
	Franklin Fair Prospect	H. D. Sweet and J. E. Barton, Visalia (1916)	appr.	18S	31E	MD	Class D. Type 1. Lead-zinc prospect 1½ miles SE of Mineral King at the junction of Fairwell Gap and Franklin Canyons. Idle in 1916. (Franke 30:471; Tucker 19d:950)
284	Galena Cave	R. V. Powell, Camp Wishon (1930)	29	19S	31E	MD	Class D. Type 1. Zinc-lead prospect on the Tule River in Camp Wishon district. See also Powell mine. (Franke 30:467)
	Harding Claim	John Harding, Camp Wishon (1930)	appr.	20S	31E	MD	Class D. Type 1. One claim developed by a shallow shaft, adit, and open cuts. Located NE of King Soloman claims in the Camp Wishon district. (Franke 30:471)
	Iron Capping	J. S. Johnson, Frank Carson, and George McGeorge, Visalia (1916)					Class D. Type 2. **Sixteen miles** NE Springville on ridge north of South Fork Tule River, at 7100 feet elevation. Eighteen claims located on a 200 by 500-foot gossan. Prospect pits 4-6 feet deep disclosed the presence of a complex sulfide body of chalcopyrite, pyrite, galena, and sphalerite. (Tucker 19d:951)

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	King Soloman Claims (Black Jack)	D. Elkins, 140 North Gardner Street, Hollywood and Bill Elster, Springville (1930)	appr.	20S	31E	MD	Class D. Type 1. Located 3 miles NE of Camp Wishon on Alder Creek at 5000 feet elevation. Massive sphalerite of the high iron variety. Reported assays show 29.61% zinc, 1.22% lead, 2.6 ounces of silver, and some gold. Developed by a 220-foot adit. (Franke 30:471)
285	Lady Franklin	T. J. Crabtree, Mineral King (1929)	25	17S	31E	MD	Class D. Type 2. Consists of 2 claims, $1\frac{1}{2}$ miles SE of Mineral King at an elevation of 9800 feet. Galena, sphalerite, chalcopyrite, arsenopyrite, and stibnite occur in thin-bedded limestone intercalated with slate striking N 50° W and dipping 70° NE. (Eric 48:353; Franke 30:468-469; Goodyear 88:647; Tucker 19d:951)
286	McGeorge	George McGeorge, Springville (1930)	9	20S	31E	MD	Class D. Type 1. Comprises 5 lead-zinc claims, about 2 miles east of Camp Wishon. Developed by open cuts and short adits. (Franke 30:467)
	McGinnis Group	W. F. Cord, Mineral King (1930)	appr.	17S	31E	MD	Class D. Type 1. Five claims, lead-zinc prospect about $1\frac{1}{2}$ miles NE of Mineral King on a ridge north of Monarch Canyon at 10,600 feet elevation. Interbedded limestone and slate intruded by granite. Ore occurs along contact in an epidote gangue. Developed by prospect shafts and adits. (Franke 30:469; Tucker 19d: 951-952)

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Meadows Group	Raymond Meadows, Springville (1916)					Class D. Type 1. Camp Wishon area, 16 miles NE of Springville on ridge north of North Fork of Alder Creek at an elevation of 5200 feet. Three claims on a 3-foot zone mineralized with sphalerite in an epidote gangue. Zone strikes N 40° W, dips 45° N on contact between limestone and mica schist. Prospected by open cuts and short adits. Idle in 1916. Tucker 19d:952)
	Monarch Group	George McGeorge, J. S. Johnson, and Frank Carson, Visalia (1916)					Class D. Type 1. Camp Wishon area, 16 miles NE Springville on ridge north of North Fork of Alder Creek at 5000 feet elevation. Eight claims on mineralized zone in limestone and schist; sphalerite in epidote gangue. (Probably same as George McGeorge.) (Tucker 19d:952)
	Peach Dumpling Claim	Jack Dodge, Springville (1916)					Class D. Type 1. Camp Wishon area, 15 miles NE Springville on ridge N of Alder Creek. Sphalerite in epidote gangue. Idle in 1916. (Tucker 19d: 952)
287	Prince Albert		3	20S	31E	MD	Class D. Type 1. Zinc-lead prospect in the Camp Wishon district. (Franke 30:467)
288	Powell (Powell No. 6)	Albert Smith, Fred Padula, Postoffice Box 17, Cuyama and Ben Bell, Room 2, Professional Bldg., Bakersfield (1951)	19,30	19S	31E	MD	Class D. Type 2. Comprises 12 claims located four miles above Camp Wishon on the Tule River at an elevation of 5200 feet. Replacement bodies of complex massive sulfides consisting of pyrite, chalcopyrite, sphalerite, argentiferous galena, and gold, occur along fractures and contact zones between slate and chlorite-schist. Replacement has occured along intercalated

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Powell (continued) (Powell No. 6)						limestone lenses. In 1951 and in 1952 small trial shipments were made to Miami smelter and to Wickenburg. These shipments were from copper-rich zones and showed an average of 5.07% recoverable copper and 8.2 ounces of silver. (Aubury 05:234; 08:290; Eric 48:353; Franke 30:435-436; Tucker 19d:909-910)
	Sequoia (Sequoia Silver-Lead)	Charles T. Williams, Box 4, Porterville (1930)	appr.	17S	31E	MD	Class D. Type 1. Mineral King district. Comprises 7 claims, NW of Mineral King on the East Fork Kaweah River at an elevation of 7500 feet. A 7- to 30-foot vertical zone striking north in limestone is mineralized with argentiferous galena. A body of schist lies to the east, and granite gneiss to the west. Developed by a 60-foot vertical shaft, 30-foot tunnel, and 50 feet of drifts. Small shipment of oxidized ore in 1930 contained about 0.32 ounce of gold per ton, 807 ounces of silver per ton, and 16.70% lead. (Included Comanche and Dolly Varden in 1930.) (Franke 30:469)
	Silver King Claim	M. C. Griggs, Three Rivers (1930)	appr.	17S	31E	MD	Class D. Type 1. Lead-zinc prospect 2 miles SE of Mineral King in Franklin Canyon below Franklin Lake. Elevation 10,000 feet. Galena and sphalerite occur along contact between siliceous limestone and slate. Strike of zone in N, dip 75°E. Developed by shallow prospect shafts along outcrop. Idle in 1916. No known production. (Franke 30:471; Tucker 19d:952 953)

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Silver Lake Zinc	T. J. Crabtree Mineral King (1930)	appr.	17S	31E	MD	Class D, Type 1. Two claims. Zinc prospect 2 miles SE of Mineral King on the slope of ridge north of Lower Franklin Lake at an elevation of 10,000 feet. Sphalerite with minor galena occurs on limestone-granite contact in an epidote gangue. Idle in 1916. (Franke 30:469-470; Tucker 19d:953)
	Silver Queen Claim	W. R. Wood Three Rivers (1916)	appr.	17S	31E	MD	Class D, Type 1. Sphalerite and galena in epidote gangue on contact between siliceous limestone and slate. Idle in 1916. (Tucker 19d: 953)
289	Skylark		20	19S	31E	MD	Class D, Type 1. Lead-zinc prospect in Camp Wishon district. (Franke 30:467)
290	Thunder Shower and Buckhead Zinc	J. M. Aiken, W. A. Alesler, Springville (1916)	5	20S	31E	MD	Class D, Type 1. On ridge north of North Fork Alder Creek at 5200 feet elevation. Six to eight feet of sphalerite on contact between limestone and mica schist. Strike is N 40°W, dip 40°N. Developed by a 208-foot adit which cut the ore 159 feet from the portal. The limestone occurs as irregular lenses in the mica schist. Three men were employed on development work in 1916. (Tucker 19d: 953)
291	White Chief	T. J. Crabtree Mineral King (1930)	31	17S	31E	MD	Class D, Type 1. One patented and 2 unpatented claims in White Chief Canyon, $2\frac{1}{2}$ miles south of Mineral King at 10,000 feet elevation. This was the original discovery

TULARE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	White Chief (continued)						in the Mineral King district. A 6- to 8-foot zone in limestone at granite contact is mineralized with galena and sphalerite. Developed by a 100-foot shaft, 195-foot tunnel, and open cuts. No known production. (Franke 30:470; Goodyear 88:646; Tucker 19d: 953-954)
292	White Horse	E. H. Kemble, Tulare (1916)	11	17S	31E	MD	Class D, Type 1. 1½ miles N Mineral King on slope of ridge SE of Timber Gap at 11,400 feet elevation. Sphalerite and galena on limestone-granite contact. Developed by several short tunnels, prospect pits and shafts. Idle in 1916. (Tucker 19d:954)
293	Young America	W. F. Cord, Porterville (1916)	1,2	17S	31E	MD	Class D, Type 1. Mineral King district. Comprises 3 claims, Young America, Rothchild, and Zinc King, on Cliff Creek. Sphalerite and galena in a zone trending NW, dipping 75°SW at limestone-granite contact. These claims now within the Sequoia National Park. (Franke 30:471; Tucker 19d: 954)

TUOLUMNE COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	App						See: Hitchcock (Logan 28:29)
	Black Oak	Black Oak Mining & Milling Company, Soulsbyville (1923)	36	2N	15E	MD	Class D. Gold mine one mile west of Soulsbyville in East Belt district. A 2-foot quartz vein in granodiorite where cut by diorite dikes was mineralized with gold in association with arsenopyrite, pyrite, pyrrhotite, marcasite, galena, and sphalerite. Developed by an 1800-foot, 70-degree incline and 2 shallow inclines. Large recorded gold-silver production prior to 1928, by cyanidation. No base-metal recovery. The gold to silver ratio was 1 to 2. About 70 tons of $13 to $20 ore were being treated per day in 1917. Recovery was reported as 94%. (Crawford 94:299: 96:474; Goldstone 90:744-746; Irelan 88:665-666; Logan 28:10-11,23; Preston 93c: 501; Storms 00:137-138; Tucker 16b:138-140)
	Cloudman						See: Erin-Go-Bragh
	Cordova						See: Prudhomme. (Logan 28:36)
	Cullers	W. C. Ryden					Class D. Gold mine in East Belt district. Small production of gold concentrates containing recoverable lead.
	Draper (Whitto)	T. Whitto, Soulsbyville, (1901) Draper Vein Syndicate San Francisco (1935) Earnest O. Carne, Soulsbyville (1939)	36	2N	15E	MD	Class D. Gold mine. Three parallel veins about 18 inches wide in granodiorite, strike N20E, dip 50 to 75W, and are mineralized with gold associated with galena, sphalerite, pyrite, marcasite, and pyrrhotite. Holdings comprise 25 acres at an elevation of 2800 feet. Developed by a 630-foot shaft with 6 levels at 100-foot intervals. Produced 1901 to 1939, intermittently. Total production about 8000 tons of gold ore. Minor lead and copper were recovered.

TUOLUMNE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Draper (continued) (Whitto)						(Crawford 96:494; Logan 28:26, 41; Tucker 16b: 144)
	Dutch-App						See: Hitchcock (Logan 28:29)
	Erin-Go-Braugh (Cloudman)	M. R. Bach, 28 West Vine Street, Stockton (1949) Operators: Del Gold Corporation C. B. Little, pres. Chicago, Illinois (1940) Marion Gold Mining Corp., Lathrop, California, (1948)	NE$\frac{1}{4}$ 27	1N	14E	MD	Class D. Gold mine. A total of 31 acres, patented along 2000 feet of a quartz vein mineralized with chalcopyrite, gold-silver, and minor galena. Developed by a 250-foot shaft and open cuts. Produced about 27,000 tons of gold-copper ore which was reduced to about 4,000 tons of gold-copper concentrates also containing recoverable lead. The gold to silver ratio was about 3 to 1. (Crawford 96:478; Eric 48:354; Logan 24:20; 28:27; 49: 64-65)
	Experimental	Thomas & John Conlin, Columbia (1928) F. W. Schoettgen, Columbia (1949) Operators: Experimental Mining Co., Nevada (1928)	1	2N	14E	MD	Class D. Gold mine, 1$\frac{1}{2}$ miles north of Columbia on the North Fork of Stanislaus River. Comprises 3 claims, a mill site and 1 patented placer claim. Ore shoots along a 3-foot vein striking N 20° W, dipping 40° E, contain free gold associated with pyrite, galena, and chalcopyrite. Occur mainly at intersections of quartz vein and diorite dikes in dolomitic limestone. Developed by a 630-foot inclined shaft and 3000-foot drainage tunnel. Production not determined. (Hamilton 22:40; Irelan 88:658-660; Logan 24:20; 28: 16-17, 27; 49:65-66; Tucker 16b: 148)

TUOLUMNE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	Golden Star	George & John Miller, Box 681, Sonora (1951)	32	2N	14E	MD	Class D. Gold mine located in Kennedy Gulch, Sawmill Flat, near Sonora. Equipped with a 10-ton ball mill. Shipped concentrates 1940-1951, intermittently, containing recoverable lead and copper in addition to gold-silver. The gold to silver ratio is about 2 to 1. (Crawford 96:480; Logan 28:28)
	Hazel Dell	Hayes & Symons Inc. Sonora, California (1937)	35,36	3N	15E	MD	Class D. Gold mine. Comprises 104 acres. A 1 to 3-foot vein at mica-schist and quartzite contact with granodiorite. The veins appear to be related to adjacent dikes. Free gold is associated with chalcopyrite, galena and pyrite. Operated 1936-39 producing about 900 tons of gold ore. Gold to silver ratio was about 1 to 4. (Crawford 96:481; Logan 28:29; Tucker 16b; 151-152)
	Hitchcock (App, Dutch-App)	Sonora Abstract & Title Company, Sonora (1936) Operator: Will Halloran, Jamestown, (1937)	22	1N	14E	MD	Class D. Gold mine 2 miles south of Jamestown. Comprises 40 acres at an elevation of 1680 feet. Quartz stringers in slate, schist, and meta-andesite, with amphibolite schist, and serpentine forming the hanging and foot walls, respectively. Developed by a 200-foot inclined shaft. Operated 1935-1937, producing about 9000 tons of gold ore containing recoverable lead and copper. Gold to silver ratio was about 3 to 2. (Crawford 94:299; 96:473; Eric 48:355; Irelan 88:660-661; Logan 21:482-483; 23:144; 28:12-14, 22, 29; Storms 00:130-131; Tucker 16b:136-137)
	La Guria	A. De Ferrari, Groveland, California (1928)	21,	1S	16E	MD	Class D. Gold mine; 20 acres at an elevation of 2900 feet. Developed by a 150-foot shaft, 500-foot tunnel, and 200 feet of drifts. Produced 1936-1941, intermit-

TUOLUMNE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION SEC.	T.	R.	B & M	REMARKS
	La Guria (continued)	Operators: LaGuria Gold Mining Company, Los Angeles (1941)					tently. Total production during that period, about 2800 tons of gold ore containing recoverable copper and lead. Gold to silver ratio was about 4 to 1. (Eric 48:355; Logan 28:31; Tucker 16b: 153)
	Lead	W. B. Clement Tuttletown (1896)	30(?)	2N	14E	MD	Class D. Gold mine, about ½ mile west of Tuttletown. Galena and gold in quartz, ankerite, magnesite, talc, and mariposite gangue in amphibolite schist. Developed by a shaft. Production unknown. (Crawford 96:484; Fairbanks 90:56)
	Longfellow	R. S. McPherson, 1300 Ninth Street Antioch (1949)	30	1S	16E	MD	Class D. Gold mine at Big Oak Flat; comprises 16 acres at an elevation of 2900 feet. Two veins, 5 and 10 feet wide, 50 feet apart in Calaveras slate, strike E and dip 50° S. Free gold associated with galena and minor chalcopyrite. Developed by a 30-degree incline with 9 levels at 100-foot intervals. Produced intermittently since 1889. Large recorded gold production. Gold to silver ratio was 7 to 3. (Crawford 94:303; 96:484; Irelan 88:672-673; Logan 28:32; 49:69-70; Preston 93c: 494; Storms 00:139; Tucker 16b: 154)
	Lucky Strike Prospect	J. D. Thomas Confidence (1928) Mel Coeur, Box 198 Sonora, (1951)					Class D. Comprise 6 gold claims on the east side of North Fork, Tuolumne River, 3 miles from Confidence. White quartz in granite is mineralized with gold, associated with sphalerite, galena, and pyrite. Developed by a 160-foot adit. Produced 1947-1951, about 330 tons of gold ore. Base-metal recovery not reported. The gold to silver ratio was about 3 to 1. (Logan 28:18-19)

TUOLUMNE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Mildred Lloyd (Star)	J. B. Simdar, 901 Mills Building, San Francisco (1941) Operator: Grant and Bryan, Columbia (1941)	23,24	3N	15E	MD	Class D. Gold mine. Quartz vein in slate about 200 feet from granite contact is mineralized with free gold in association with galena, sphalerite, chalcopyrite, and pyrite. Developed by a 170-foot shaft, 155-foot tunnel, 80-foot winze, and about 1000 feet of drifts. Produced 1929-1941, intermittently, about 155-tons of gold ore. Concentrates shipped contained about 9.6% lead and recoverable copper. Gold to silver ratio was about 1 to 1. (Crawford 94:492: 96:163; Eric 48:355; Logan 28:38)
294	Michell (Bonne Terre)	Locke Robinson, Sonora (1916) Rodden Bros., 1st National Bank, Oakdale (1928)	30	2S	14E	MD	Class D. Type 2. Complex sulfide deposit one mile west of Oak Hill mine. Ore minerals are chalcopyrite, sphalerite, gold and silver. Developed by 125-foot shaft. Production not determined. (Eric 48:355; Logan 28:7, 33; Tucker 16b:135)
	Morning Glory	C. Layman, J. A. King, Confidence (1928)	appr.	2N	16E	MD	Class D. Five gold claims at 3010 feet elevation, just east of North Fork, Tuolumne River, 3 miles from Confidence. A vein 6 inches to 2 feet wide is mineralized with galena, pyrite, and free gold in ribbon-quartz at a point where a dike intrudes granodiorite. Production not determined. (Logan 28:19, 33)
295	Oak Hill	Mrs. H.L. Langdon, San Leandro (1930) W. M. Collins, Mills Building, San Francisco (1948)	32	2S	14E	MD	Class D. Type 2. Copper mine. Main production was from chalcocite zone. Chalcopyrite, galena, and sphalerite in sulfide zone is low grade. Developed by a 500-foot vertical shaft and 1000 feet of drifts. Produced copper-silver-gold ore 1929-30; minor lead was also recovered. The average smelter recovery was about 4.87% copper, 5.36 ounces of silver per ton, and 0.464 ounce of gold per

TUOLUMNE COUNTY (CONT.)

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Oak Hill (continued)						ton. (Aubury 05:202; 08:250-251; Eric 48:355; Julihn 40: 85-86; Lang 07:1010; Logan 28:7; Tucker 16b:135)
	Providence	New Providence Gold Mining Company, 2041 Emerson Street Berkeley (1928)	9	1N	16E	MD	Class D. Gold mine. Comprises 90 acres at an elevation of 2600 feet. East Belt district, 2½ miles SE of Tuolumne. A 5-foot vein striking N8E, dipping 45E in slate and limestone intruded by granodiorite, is mineralized with free gold associated with galena and pyrite. Sulfides constitute about 2% of the ore. Developed by a 1300-foot shaft with levels at 100-foot intervals. Reported to have produced between 1897-1908, about $700,000 in gold. (Logan 28:20, 36; Storms 00:138; Tucker 16b: 159)
	Prudhomme (Cordova)	A. W. Bryant, Carters (1905) Claire McNee, c/o M.W. McIntosh, 114 Sansome Street San Francisco (1928)	33	2N	16E	MD	Class D. Gold associated with galena occurs in a 1 to 2-foot quartz vein in slate. Produced 1900-1905, about 2400 tons of gold ore containing recoverable lead. Gold to silver ratio was 4 to 1. (Crawford 96:489; Logan 28:36)
	Star						See: Mildred Lloyd
	Whitto						See: Draper (Logan 28:26)

VENTURA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Harris	Charles B. Fyle, Frazier Park (1932)					Class D. Gold mine in the Snowy district. Gold associated with argentiferous galena. Developed by 500 feet of adits. Produced gold from the oxidized zone by cyanidation in 1932-33. Small shipment of sulfide ore made during the same period; smelter recovery 14.3% lead in addition to gold-silver. The ratio of gold to silver was about 1 to 1.

YUBA COUNTY

MAP NO.	CLAIM, MINE, OR GROUP	OWNER NAME, ADDRESS	LOCATION				REMARKS
			SEC.	T.	R.	B & M	
	Horse Shoe	Horseshoe Company, Challenge (1933) N. A. Travis Challenge (1940) Horseshoe Gold Mining Company, c/o James B. Lesh, 224 Pleasant St., Roseville (1952)	20	19N	7E	MD	Class D. Gold mine in the Challenge district. An 18-inch quartz vein in schist. Developed by a 90-foot shaft and 450-foot drainage tunnel. Produced about 6000 tons of gold ore 1933-1940. Some concentrates were shipped which, in addition to gold-silver, contained recoverable lead and copper. The gold to silver ratio was about 8 to 1. (Eric 48:357; Logan 22:607; 30:189; 31:249-250; 35:9; O'Brien 52:167; Waring 16:449-450) MB/a

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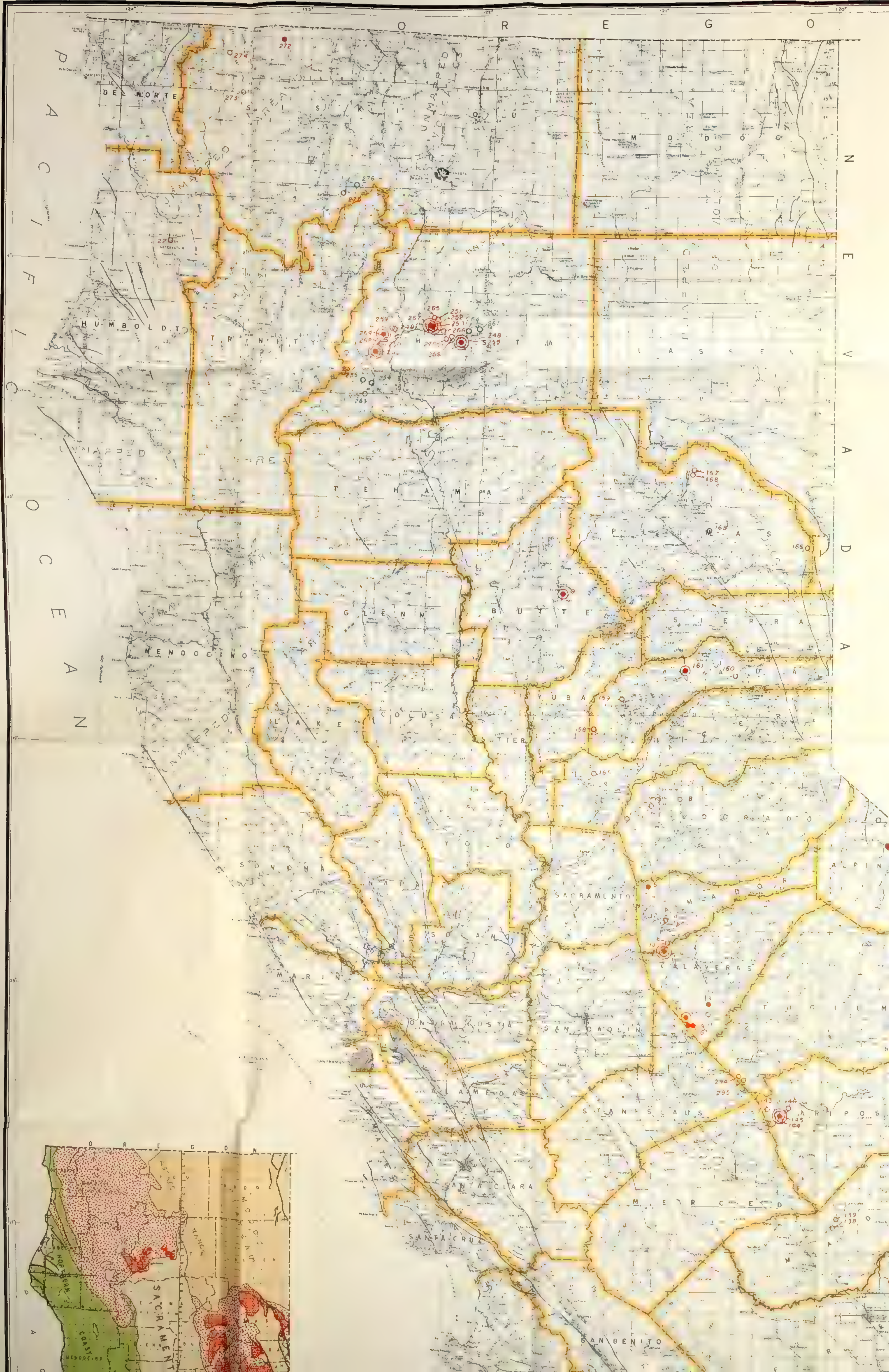

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DIVISION OF MINES
OLAF P. JENKINS, STATE MINERALOGIST

OUTLINE GEOLOGIC MAP OF CALIFORNIA SHOWING LOCATIONS OF MINES WITH LEAD AND ZINC PRODUCTION

PREPARED UNDER THE DIRECTION OF
OLAF P. JENKINS
BY J. GRANT GOODWIN

Scale 1/1,000,000
(Approximately 1 inch = 16 miles)

ECONOMIC MINERAL MAP OF CALIFORNIA
NO. 7—LEAD AND ZINC
1957

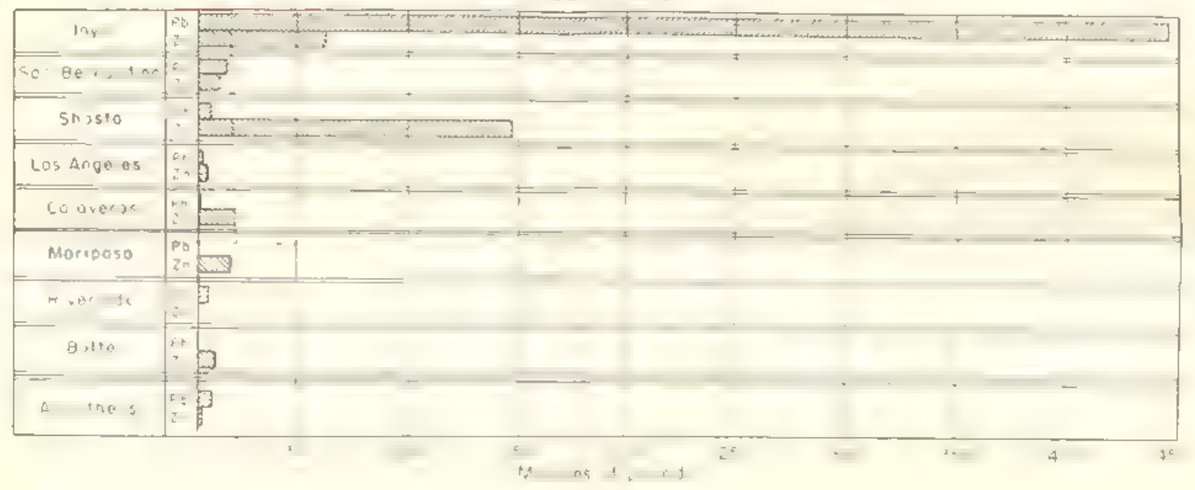
EXPLANATION

CLASSIFICATION OF MINES BY TOTAL PRODUCTION OF LEAD-ZINC, POUNDS

A Over 10 000 000	B 1,000 000 to 10 000 000	C 100 000 to 1 000 000	D 0 to 100 000	ORE TYPES AND OCCURRENCES	PROVINCE OR DISTRICT
TYPE 1 DEPOSITS					
◎	◉	●	○	LEAD-ZINC-SILVER. Gold and minor copper minerals may be present. Occur mainly as replacement ore bodies in carbonate rocks.	Basin Ranges and Mojave Desert
TYPE 2 DEPOSITS					
◎	◉	●	○	COPPER-ZINC. Gold, silver and lead minerals often present. Disseminated and massive sulfide ore in shear zones, veins and as flat-lying tabular bodies in old volcanic rocks.	Foothill Belt and Shasta District
				LEAD-COPPER-ZINC. Complex ores with gold and silver values often exceeding base metal value. Scheelite may be present in contact zones and mesothermal fissure veins.	Sierra Nevada, eastern Mojave Desert and in other areas

Numbers refer to tabulated list of text.

TOTAL PRODUCTION OF LEAD AND ZINC BY COUNTIES THROUGH 1952



ACKNOWLEDGMENTS

Base and culture after U. S. Geological Survey, [illegible] with geologic boundaries and symbols after Geologic Map of California by Olaf P. Jenkins, California State Division of Mines, 1938. Map reduced one half from original scale of 1:500,000.

Source data compiled from published and unpublished reports of the State Division of Mines, U. S. Bureau of Mines, U. S. Geological Survey, mining companies and mine operators. Statistical data compiled with the cooperation of the U. S. Bureau of Mines, Mineral Statistics Branch.

LEAD AND ZINC IN CALIFORNIA

History of Production

The rich silver-lead-zinc deposits of Cerro Gordo, discovered by Mexicans in 1865, were first worked primarily for silver. Darwin, an equally famous silver camp, was discovered about 1874 and is today California's most important lead-producing district. The Shoshone or Tecopa mines in southern Inyo County were brought into production about 1910. From 1871 through 1952 the total production of lead from California was about 447 million pounds, of which Inyo County produced an estimated 94 percent. Of this total, about 50 percent was produced after 1942 from the Darwin and Tecopa mines. California's annual production since 1942 represents about 2 percent of the annual national total.

Zinc mining in California began, in part, as an outgrowth of copper mining which in turn resulted from the search for gold in the iron-rich gossans along the Sierra Nevada foothill copper belt and in the Shasta copper district. Mining along the Foothill belt began in 1860 when Quail Hill was located as a gold prospect. Below the gossan, secondarily enriched copper ore was found. By 1865 most of the major copper deposits had been discovered. Primary ore below the enriched zone was found to contain zinc sulfide, but not until 1906 was zinc recovered from the foothill copper ores. During World War II about [illegible] complex sulfide mines in 8 counties along the foothill belt were in operation, using selective flotation. Between the years 1942 and 1946 about 25,000,000 pounds of zinc, in addition to 22,000,000 pounds of copper, were produced from this district. The total production of the foothill belt from 1860 to 1946 was more than 40 million pounds of zinc in addition to [illegible] million pounds of copper.

The history of development of the Shasta copper-zinc district parallels that of the foothill copper-zinc belt. Copper mining began in 1894 at the Iron Mountain mine but it was not until [illegible] that zinc was recovered from the complex ores. The total production of zinc from the Shasta district has been more than 140 million pounds.

Ore was first mined for its zinc content at the Cerro Gordo mine in [illegible] when large bodies of secondary zinc carbonate were found in the footwalls of old lead-silver stopes. By [illegible] Cerro Gordo had produced more than 23 million pounds of zinc. Not until the advent of selective flotation did zinc become an important by-product in concentrating lead-silver-zinc and copper-zinc ores. At the present time the production from Inyo County lead-silver-zinc ores is the major source of zinc in California. The copper-zinc mines of the foothill belt and Shasta district are inactive.

Mining Methods

The [illegible] strength of the ore body as well as strength and general character of the wall rock. Large scale methods such as open pit, block caving and sublevel caving are by far the cheapest mining methods but the size of California deposits has restricted the use of such methods. The glory-hole method of drawing off broken ore from below has been applied on a small scale at some of the larger deposits, and some small-scale open-cut mining has been feasible, but in general expensive underground methods have been necessary.

Mining of massive copper-zinc sulfides in the west Shasta district where ore bodies are horizontal has, in general, proceeded from adits, where topography permitted. Raises to the ore bodies served as ore passes for stopes developed by overhand and breast stoping. The horizontal stopes allowed the use of slusher scrapers and eliminated the need for excessive hand shoveling. Stopes developed from winzes were mined by underhand and breast stoping. Steep-dipping ore bodies were developed from adits where practical and ore removed by shrinkage stoping where walls were fairly strong. Mining ore shoots along steep dipping faults where ground was heavy, often required square-set timbering. More or less timbering was required in all the Shasta mines.

In the East Shasta district at the Bully Hill, Rising Star, Copper City, and Afterthought mines ore shoots, in general, were steep dipping. This is true also of the Foothill deposits. The subdued topography made access by shafts and inclines necessary. Where the walls would stand, shrinkage stoping was generally used; where ground was heavy, shrinkage stoping was not applicable and much timbering and back filling were necessary.

In the Basin Ranges and Mojave Desert where carbonate rocks predominate, walls stand well and require little timbering. Large open-stopes are very common and it is seldom necessary to leave pillars. Mining costs are lower than in the other districts. Shrinkage stoping is usually possible in the steep-dipping ore shoots and ore from large open stopes can be cheaply removed by mechanical equipment. Where topography permits, raises from haulage adits develop the shallow levels. Deeper levels are generally developed from underlying shafts via crosscuts.

Metallurgy and Marketing

Smelter operations were attempted at Cerro Gordo, Darwin, in the Foothill copper-zinc belt, and in the Shasta copper-zinc district but because of the dependency on local ores, smelters were not able to operate at a profit over a long period. At the present time no smelters are in operation within the mining districts and the mine operator must ship his ore or concentrates to a custom smelter. High-grade lead ore is generally shipped directly to a smelter without beneficiation. Lead ore high in zinc content is either treated by selective flotation to produce separate concentrates or shipped to a concentrator-smelter which has its own milling division. Most copper-zinc ores are too low grade to bear shipping and must be milled and treated by selective flotation to produce separate high-grade concentrates which are then shipped to appropriate smelters. Contained metal in the ores and concentrates becomes the property of the smelting company after a settlement has been made with the shipper and the problem of marketing rests solely with the smelting company.

Uses, Demand and Prices. Lead and zinc are two of the most common base metals upon which industry relies for a wide variety of fabricated commodities. Their production and consumption are exceeded only by steel, copper, and aluminum.

Lead is firmly entrenched in most of its uses but is not entirely free of competition from substitutes. The physical and chemical properties which make lead of great value [illegible] low melting point, alloyability with other metals, and its shielding effect to radiation.

The physical and chemical properties which give value to zinc in modern industry are primarily its resistance to corrosion and its alloyability with other metals.

During the period 1948 [illegible] lead was consumed by industry as follows: (1) storage batteries 31.6 percent; (2) tetraethyl lead 10.7 percent; (3) cable coverings 12.7 percent; (4) pigments 11.[illegible] percent; (5) construction 9.4 percent; (6) solder 6.7 percent; (7) ammunition 3.4 percent; (8) bearing metals [illegible] percent; (9) type metal 2.1 percent; (10) all other 8.5 percent. The automotive industry consumes over 40 percent of the total lead in the form of storage batteries and tetraethyl lead. The majority of the lead used in storage batteries is ultimately recovered as scrap. The major losses are in lead consumed in tetraethyl lead and in pigments.

Aluminum and plastics are now in competition with lead in certain types of cable sheathing, however, the greater expense of aluminum prevents any serious competition at present. Nickel-cadmium storage batteries, though of much greater initial cost, have greater life and efficiency. They are not generally available to the public at present but may in the future be a serious threat to lead in its primary field of use. Titanium and other pigments are being used more and more in place of lead pigments, and the use of lead foil has declined in favor of plastics and aluminum. The only new use which may be of significance to the future of lead is its use as a shield in atomic radiation devices.

The value of zinc in the galvanizing and zinc alloy industries has resulted from the relative abundance and cheapness of this common base metal. Zinc galvanized steel has filled an immediate need for cheap, corrosion-resistant material. The main disadvantage is the weight and for this reason aluminum sheeting, though of higher cost, has become a serious competitor. As the cost of aluminum has been reduced through technological advances in smelting, aluminum has also become competitive in the die casting industry. The reluctance of manufacturers to switch to substitutes has had a moderating effect on the relative decline of the zinc industry. The price of zinc must remain considerably below aluminum in order to compete with it.

During the period 1948 [illegible] zinc was consumed by industry as follows: (1) galvanizing 43.1 percent; (2) zinc base alloy 30.4 percent; (3) brass products 16.6 percent; (4) rolled zinc 6.4 percent; (5) zinc oxide 1.[illegible] percent; (6) all other 1.6 percent.

The average annual market price for lead has fluctuated from a low of 3.18 cents per pound in 1932 to a high of 18.04 cents per pound in 1948. The market price for zinc has fluctuated from a low of 2.876 cents per pound in 1932 to a high of 18.0[illegible] cents per pound in 1951.

Geologic Aspects

Mineralogy of Ores. The only important primary minerals of lead and zinc in California deposits are galena (PbS) and sphalerite (ZnS). Both of these minerals are relatively unstable under the oxidizing conditions which prevail above the water table. Galena alters to form anglesite ($PbSO_4$) which may further alter to form cerussite ($PbCO_3$). These oxidized minerals commonly are more abundant in shallow deposits than the original or primary mineral galena. Sphalerite is usually leached from the ore in the oxidized zone but some zinc usually remains as hemimorphite ($Zn_4Si_2O_7(OH)_2 \cdot H_2O$) or smithsonite ($ZnCO_3$). Zinc is sometimes reprecipitated at a lower horizon in the form of zinc carbonate. Silver which [illegible] (Ag_2S), or in solid solution in the galena molecule. In the oxidized zone the primary silver bearing minerals are also unstable and silver is generally found native or in combination with the halogens.

Distribution and Geology of Deposits. Combinations of lead, silver, and zinc are found principally in the Basin Ranges and Mojave Desert area in carbonate rocks of Paleozoic and pre-Cambrian age. The copper-zinc deposits are found along the Sierra Nevada foothills and in the Shasta district. In the Sierra Nevada foothills the copper-zinc mineralization is confined to zones of shearing and faulting in a metamorphic-igneous complex of Paleozoic to Mesozoic age. The Shasta copper-zinc deposits occur almost entirely within large volcanic sheets of porphyritic rhyolite of Paleozoic and Mesozoic age. Minor deposits of complex copper-lead-zinc sulfides associated with precious metal ores occur in fissure veins and contact deposits in various rock types throughout the southern Sierra Nevada, Mother Lode, East Belt and Klamath Mountains base-metal districts.

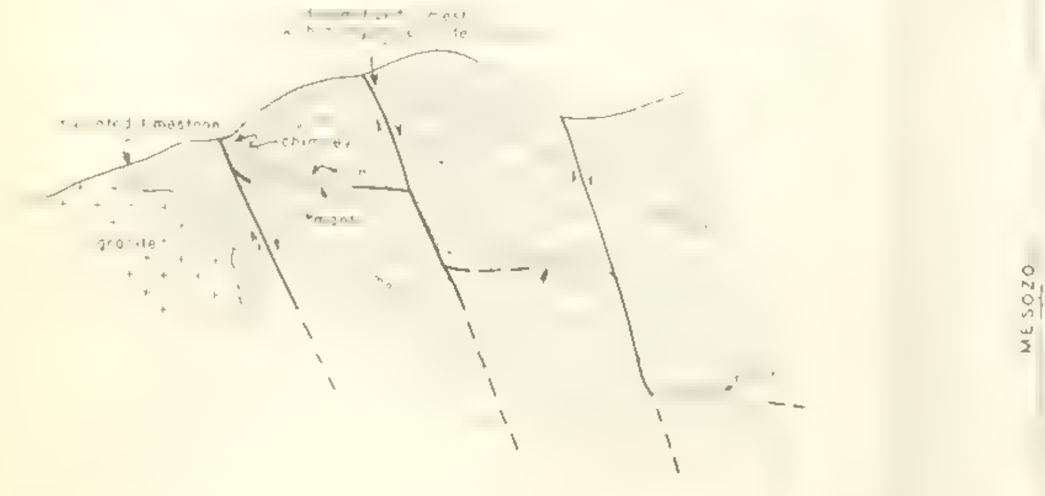
CLASS A PRODUCERS
(over 10,000,000 lb. lead and zinc)

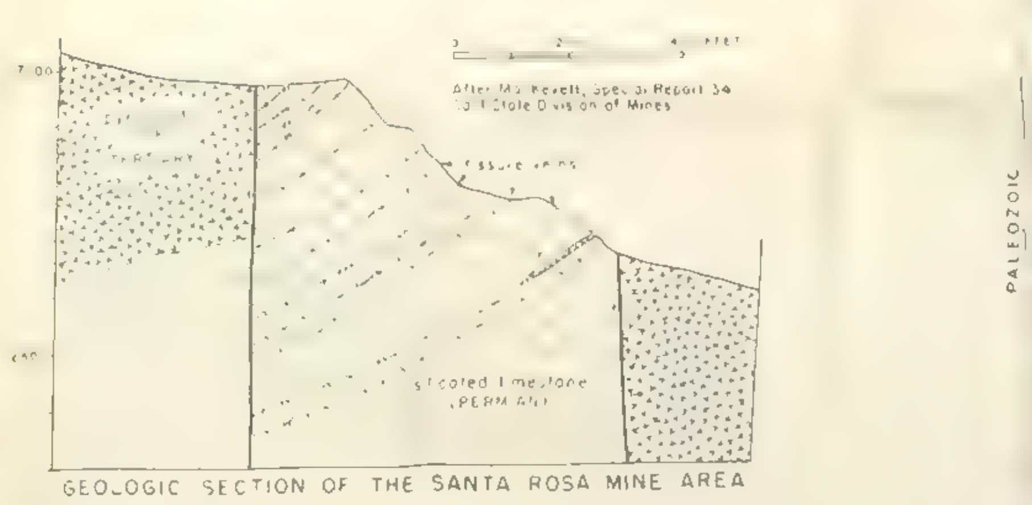
Map No.	Name
	Calaveras County
14	Penn (Type 2)
	Inyo County
45	Cerro Gordo (Type 1)
[illegible]	Darwin (Type 1)
[illegible]	Estelle and Morning Star (Type 2)
111	Santa Rosa (Type 1)
113	Shoshone (Type 1) (Tecopa Group)
	Mariposa County
147	Blue Moon (Type 2)
	Shasta County
248	Afterthought (Type 2)
252	Bully Hill (Type 2)
[illegible]	Iron Mountain (Type 2) (Hornet-Richmond)
[illegible]	Mammoth (Type 2)
267	Rising Star (Type 2)

CLASS B PRODUCERS
(1,000,000 to 10,000,000 lb. lead and zinc)

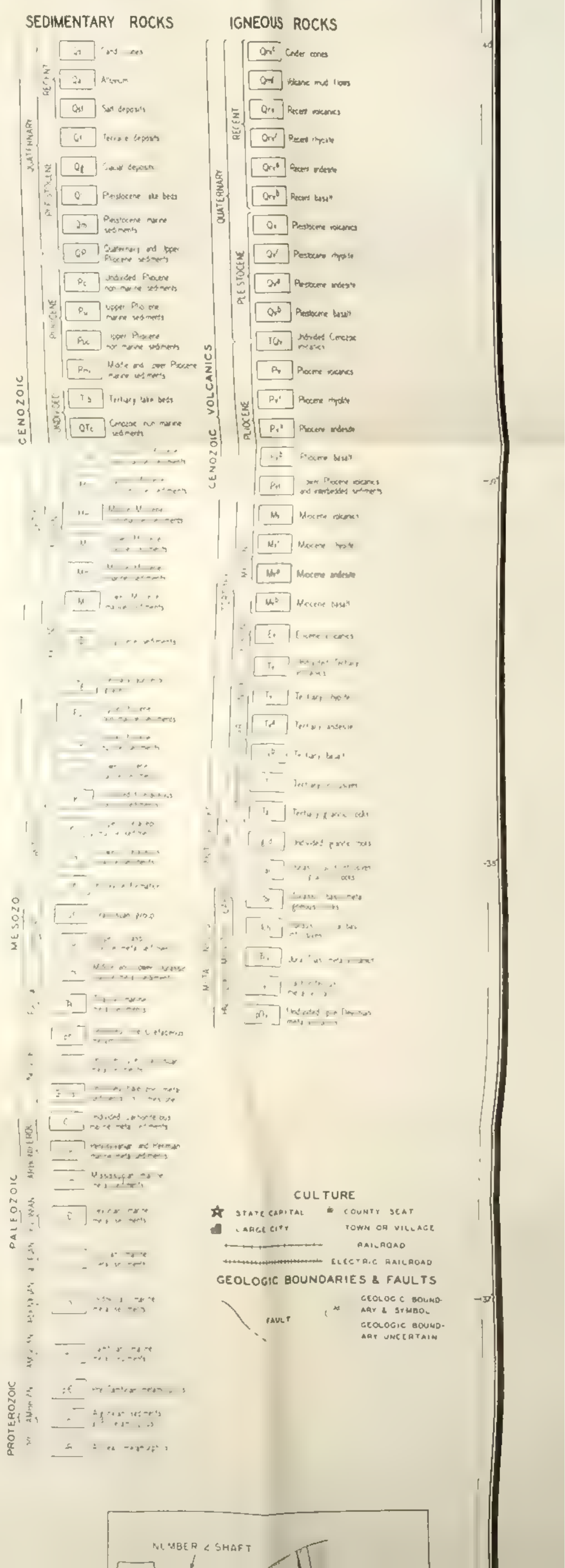
Map No.	Name
	Butte County
[illegible]	Big Bend (Type 2)
	Calaveras County
15	Quail Hill (Type 2)
	Inyo County
44	[illegible] (Type 1)
48	Christmas Gift (Type 1)
[illegible]	Copper Queen [illegible] (Type 2)
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible] (Type 1)
[illegible]	[illegible] (Type 1)
	Los Angeles County
[illegible]	[illegible]
	Orange County
102	[illegible] (Type 1)
	Riverside County
[illegible]	[illegible]
	San Bernardino County
[illegible]	Carbonate King [illegible]
[illegible]	Copper World [illegible]
	[illegible] (Type 2) [illegible]
[illegible]	[illegible]

DIAGRAMMATIC GEOLOGIC SECTION OF THE DEFENSE MINE, INYO COUNTY





GEOLOGIC SECTION OF THE SANTA ROSA MINE AREA



CONTRA COSTA
SAN JOAQUIN
TUOLUMNE
ALAMEDA
STANISLAUS
MARIPOSA
SANTA CLARA
MERCED
SANTA CRUZ
MADERA
FRESNO
SAN BENITO
MONTEREY
INYO
TULARE
KINGS
SAN LUIS OBISPO
KERN
SANTA BARBARA
VENTURA
LOS ANGELES
SAN BERNARDINO
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL
NEVADA
ARIZONA
MEXICO
GULF OF SANTA CATALINA
CULTURE
STATE CAPITAL
COUNTY SEAT
LARGE CITY
TOWN OR VILLAGE
RAILROAD
ELECTRIC RAILROAD
GEOLOGIC BOUNDARIES & FAULTS
FAULT
GEOLOGIC BOUNDARY & SYMBOL
GEOLOGIC BOUNDARY UNCERTAIN
MESOZOIC
PALEOZOIC
PROTEROZOIC
PENN MINE

MAP OF CALIFORNIA

SHOWING

LEAD-ZINC DEPOSITS

IN RELATION TO

GEOMORPHIC PROVINCES AND MAJOR ROCK TYPES

PREPARED BY

1957

SCALE

0 50 100 MILES

EXPLANATION

MINES WITH LEAD ZINC PRODUCTION

SEDIMENTARY ROCKS — QUATERNARY TERTIARY CRETACEOUS

(Exclusive of Mojave Desert and Basin Ranges)

Often of great thickness and barren of lead-zinc, these sedimentary rocks effectively conceal older and perhaps mineralized rocks.

VOLCANIC ROCKS — QUATERNARY TERTIARY

Including some continental deposits in Mojave Desert and Basin Ranges

Contain lead-zinc deposits in some places and may have genetic relationship to ore deposits sometimes occurring in nearby carbonate rocks.

FRANCISCAN GROUP — UPPER CRETACEOUS TO UPPER JURASSIC

SEDIMENTARY BASIC AND ULTRABASIC ROCKS

Rocks commonly assigned to this group contain a few small lead-zinc-silver deposits and occasional small zinc-bearing copper deposits.

GRANITIC ROCKS — CRETACEOUS TO PALEOZOIC AND OLDER

GRANITIC METAMORPHIC AND OLD VOLCANIC ROCKS

(Exclusive of Mojave Desert and Basin Ranges)

Within these rocks are the zinc-lead and gold-lead-zinc-copper deposits of the Sierra Nevada and Peninsular Ranges and the copper-zinc deposits of the Shasta District and the Foothill Belt.

ROCK COMPLEX OF THE MOJAVE DESERT AND BASIN RANGES — QUATERNARY TO PRE CAMBRIAN

(Undifferentiated alluvium, sedimentary, metamorphic, granitic, and volcanic rocks)

The principal lead-silver-zinc mines of California are in the older rocks of these provinces, mainly as replacement deposits in carbonate rocks. Areas of desert gravel wash, often relatively thin on pediments, in places may conceal deposits yet to be found by scientific prospecting methods.

GEOLOGIC LONGITUDINAL SECTION OF THE SHASTA KING MINE, SHASTA COUNTY

After Kinkel and Hall, Special Report 6, Calif. State Division of Mines

Rocks are of the Middle Devonian Balaklala rhyolite group

GEOLOGIC SECTION OF THE SANTA ROSA MINE AREA

After Mackevett, Special Report 34, Calif. State Division of Mines

Accompanying California Journal of Mines and Geology, vol. 53, nos. 3-4 (July-October 1957)

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